

**THE MAILED FIST: TANKS IN WORLD WAR TWO  
(EUROPEAN THEATER)**

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**FRANK FORESTER EGBERT**

THE MAILED FIST: TANKS IN WORLD WAR TWO  
(EUROPEAN THEATER)

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An Abstract  
Presented to  
the Graduate Council of  
Austin Peay State University

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of Arts

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by  
Frank Forester Egbert  
June 1977



## ABSTRACT

Blitzkrieg is a term that was born in 1939, yet its concept is as old as war, itself. Germany, which had been humiliated by the Treaty of Versailles, was determined to exploit fully two new weapons of the World War. The result was "lightning warfare."

When the tank first appeared in 1916, it was grafted onto a strategy already proven ineffective. Although most military leaders realized cavalry maneuvers had become impractical--if not suicidal--in modern warfare, few recognized that the tank would be a throwback of this ancient weapon. Tanks, in the traditional role of cavalry, would owe no less of their success to morale than to actual destructive ability.

This study was undertaken with the purpose of outlining the development of the weapons called tanks, focusing on their advancement during the war in which they played such an important part--World War Two.

Several related topics will be investigated, including various types of armor protection and the role of tanks in the major campaigns of the war. Often referring to works by the greatest military minds in history, this study provides a look into the strategy of "indirect warfare," giving testimony that ancient principles apply to the warfare of today.

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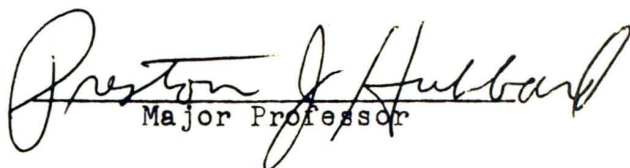
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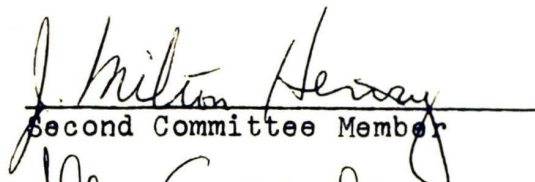


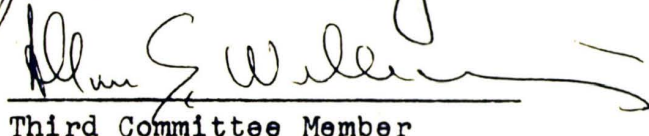
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I am submitting herewith a Thesis written by Frank Forester Egbert entitled "The Mailed Fist: Tanks In World War Two (European Theater)." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts in Education with a major in History.

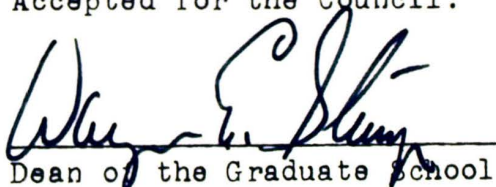
  
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## CHAPTER I

### IN THE CLASSIC STYLE

The war had been raging for just over four years. A virtual stalemate had reduced northern France to a wasteland, yet the advent of two new weapons, the tank and the airplane, revived hopes of restoring mobility to warfare.

To the German soldiers facing the Allied lines near Amiens, August 8, 1918 foreboded nothing out of the ordinary. True, a number of Canadian units had recently been introduced into the general area, but all reliable signs indicated the next Canadian offensive would be in Flanders. Meanwhile, locally-based Australian troops had extended their front to the south, thinning their own lines and creating what appeared to be a purely defensive posture.

It was an ingenious deception. Over 1,900 Allied aircraft, concentrated in the vicinity of Amiens, discouraged enemy observation craft and, at the same time, created a noise barrage to cover the rumble of a massive buildup. Further to guard secrecy, front-line troops were not informed of the plan until the day preceding the offensive. Zero-hour was scheduled for 4:20 A.M., August 8.

They came without warning. Out of a thick, cloaking ground mist clanked 456 British tanks, literally rolling over the German defenses. The infantry advance and



artillery barrage, begun simultaneously with the advance of the tanks, insured the rout. And although no vital communication lines were cut and no decisive tactical advantage was won, General Ludendorff labeled August 8 the "black day of the German Army in the history of the war." That day witnessed the surrender of approximately 21,000 German soldiers. The spirit was gone from the Kaiser's war effort. However, we are reminded this was not the first time tanks had upset German formations. Why, then, did this particular attack have such a demoralizing effect? The strike was much more than a mere penetration of trench positions. The morale of the General Staff and the battle-weary German soldiers was shaken from what was perhaps the most complete surprise of the war, a mass armored stroke without the usual preliminary artillery bombardment!<sup>1</sup>

Captain B. H. Liddell Hart, considered by most experts to be the leading tactician of modern times, noted the offensive of August 8 would be an "object lesson for future soldiers."<sup>2</sup>

Although the tank dates only from 1916, when developed to meet the particular needs of that war, its

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<sup>1</sup>Basil H. Liddell Hart, The Real War 1914-1918 (Boston and Toronto: Little, Brown and Co., 1930), pp. 429-30.

<sup>2</sup>Ibid., p. 432.

concept is based on the same principles of mobility, protection, and offensive power that have influenced warfare since the dawn of history.

The ancient chariot and the turreted ram of the Assyrians were founded on this concept. One unique variation was the elephant corps employed by both Hannibal and Kublai Khan. For a brief period during the Middle Ages, Crusader knights dominated the battlefields, splendid with their superior horsemanship, shield and chain-mail protection, and their magnificent weapons.

The later introduction of guns sharply limited the effectiveness of mounted soldiers. Further improvement of firearms following the Napoleonic Wars ended forever the common use of the massed cavalry charge. Only rarely in the past has cavalry dominated the weapons of defense, yet its importance to armies has remained unchanged.

To insure victory, it was imperative enemy movements and strength be accurately and regularly reported. Other roles of cavalry included: screening movements of its own troops; pursuing and demoralizing a defeated enemy; maintaining a threat to the enemy's rear; sudden strikes at detected enemy weak points; and exploiting a breakthrough.

With a few exceptions, the development of the machine gun made horse-mounted soldiers all but useless. The vulnerability of the horse and unprotected rider to modern weapons simply made it necessary to develop a new

mobile arm.

By October of 1914, it was evident a machine was needed which not only was impervious to machine gun fire but was capable of crossing trenches. The idea for such a machine was conceived by Lieutenant Colonel Ernest D. Swinton, who had thoughtfully observed an American invention, the Holt caterpillar tractor, pull heavy artillery behind the Allied lines. He envisioned these vehicles mounting medium guns and covered with armor to counter German barbed wire and machine guns. Swinton, an engineer by profession, was convinced he had found the answer to the problems of the Western Front. However, when he presented his ideas in a paper to Allied headquarters in France, he was firmly rejected. The majority of European generals were not only ignorant of modern technology, but were totally committed to the philosophy of personal combat. Swinton then sent a copy of his paper to Lieutenant Colonel Maurice Hankey, his teacher and personal friend. Hankey, based in London as the Secretary to the Committee of Imperial Defence, was duly impressed. He reproduced Swinton's idea in the form of a Cabinet Memorandum.

At that time, all matters connected with British motorized fighting vehicles were regulated by the Royal Navy. As a result, Hankey's memorandum was circulated through the various channels of the Admiralty.



In January of 1915, the report reached the desk of Winston Churchill, then First Lord of the Admiralty. Highly interested, he acquired the backing of the Prime Minister, Lord Asquith. Consequently, two Holt tractors were acquired and studied by a small group of experts. A favorable report was returned. Churchill then confidently created the Admiralty Landships Committee to develop the concept further.

Incidentally, due to the early involvement of the Admiralty, several naval terms were applied to various sections of the tank. Some descriptive, others not, they included hull, turret, deck, sponson, babette, super-structure, and bow.<sup>3</sup>

The origin of the name tank is curious in itself. Since secrecy during development was of the utmost importance, and any large covered object would be sure to arouse public curiosity, a way had to be found to disguise the secret. According to one source, a member of the developing committee suggested it be called a "water carrier," with the explanation that it was for use in the Sinai Desert. Another planner complained, "We call everything by initials; I will not stand for being on anything called the W. C. Committee." The word "tank" was proposed as a

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<sup>3</sup>Eric Morris, Tanks (London: Octopus Books, Limited, 1975), p. 20.

compromise, and it stuck.<sup>4</sup>

A basic knowledge of strategy is essential in grasping the causes of success or failure in a military campaign. Weapons come and go, but strategy, in principle, remains unchanged. This assertion is supported by Antoine de Jomini, who, in his Precis de l'Art de laGuerre, observes:

The new inventions of the last twenty years seem to threaten a great revolution in army organization, armament and tactics. Strategy alone will remain unaltered, with its principles the same as under the Scipios and Caesars, Frederick and Napoleon, since they are independent of the nature of arms and the organization of the troops.<sup>5</sup>

The later development of the tank, as with other advances in armaments, merely altered combat tactics. With armored skin immune to machine gun fire, tanks added a new flare to an ancient art. And while retaining the traditional shock value of cavalry, they possessed a knock-out punch never imagined by mounted soldiers.

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<sup>4</sup>S. L. A. Marshall, The American Heritage History of World War I (New York: American Heritage Publishing Co., 1964), p. 181.

<sup>5</sup>Basil H. Liddell Hart, The Sword and the Pen, ed., Adrian Liddell Hart (New York: Thomas Y. Crowell Co., 1976), p. 172. At age 28, Antoine de Jomini served as a brigade general under Napoleon. Later, as military tutor to the Russian Imperial family, he accompanied Emperor Nicholas I in the 1828 Turkish campaign. His Summary of the Art of War was published in 1837.

Although grand strategy remains more or less unchanged, it is all too often guided by a national policy contaminated by politics and anxiety. This was the case in England and France just prior to World War Two. Their sentiment toward armored vehicles and toward strategy in general resulted from two decades of reflection on the Great War.

The defensive outlook shared by both nations stemmed from fears of suffering another "lost generation." Germany, on the other hand, realized another war of attrition would yield the same negative result. Therefore, seeking a quicker and less expensive decision, Germany reverted to classic military strategy, "indirect warfare."

World War One strategy, once the initial German offensive had fizzled, was anything but classic. It was negatively inspired by the Prussian philosopher of war, Karl von Clausewitz, author of the monumental work, On War, written in 1832. Many tacticians and strategists were guided by his narrow military theory, illustrated by such quotes as:

"Blood is the price of victory."

"Only great and general battles can produce great results."

"Let us not hear from generals who conquer without bloodshed."<sup>6</sup>

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<sup>6</sup>Basil H. Liddell Hart, Strategy (London: Faber and Faber, Ltd., 1967), p. 224.



Clausewitz apparently overlooked or simply ignored the successes of the greatest generals in history. Men such as Alexander the Great, Hannibal, Fabius, Scipio, Julius Caesar, Napoleon, and Thomas "Stonewall" Jackson demonstrated mastery over opponents by their ability to mystify and demoralize. All proved to be patient, opportunistic, and loath to sacrifice their soldiers needlessly. Not only were they expert at grand strategy, but were equally adept at battlefield tactics when such encounters became necessary.

Alexander, whose Macedonian phalanx was devised to punch holes in enemy lines, followed the indirect approach in his conquest of the mighty Persian Empire. First restoring Greek colonial cities in Asia Minor, Alexander secured his rear. Proceeding then to conquer Egypt, he continued to avoid the heart and strength of the Persian Empire. These early Greek triumphs not only dimmed the aura of the Persians, but severely played on the mind of King Darius III.<sup>7</sup>

Though Alexander the Great lived in the Fourth Century, B.C., his tactics for dealing with enemy chariots proved the most effective method of defending an armored breakthrough in the Second World War. The following

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<sup>7</sup>Ibid., pp. 40-41.

illustration is from Arrian's Anabasis of Alexander.

Some few of the vehicles succeeded in passing through, but to no purpose, for the Macedonians had orders, whenever they (chariots) attacked, to break formation and let them through deliberately: this they did, with the result that neither the vehicles themselves nor their drivers suffered any damage whatever. Such as got through were, however, subsequently<sup>8</sup> dealt with by the Royal Guard and the army grooms.

In Caesar's decisive battle with Vercingetorix, he was aware he was vastly outnumbered. To make matters worse, his lines of communication had been severed. With little chance of outside help, Caesar divided his remaining cavalry reserves and sent several cohorts through the enemy lines to attack from the rear. At the same time, he led the rest in a frontal attack. Confused and terrified, the Gauls panicked and fled. Seeing their countrymen being slaughtered, the other Gauls laid down their arms. Caesar's daring use of cavalry had destroyed the morale of his opponents.<sup>9</sup>

Coolheadedness; opportunity; daring; luck: They all play major roles in successful warfare.

For the most part, Caesar, as well as the other before-mentioned commanders, rarely found himself in such

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<sup>8</sup> Hart, The Sword and the Pen, op. cit., p. 55.

<sup>9</sup> Gaius Julius Caesar, The Gallic War (Caesar's Commentaries), Book VII, trans., H. J. Edwards (London: William Heinemann, Ltd., 1966), pp. 473-509.

a desperate situation. His knowledge of his enemy's mind and his indirect approach often made general battles unnecessary.

After all, had not Sun Tzu written that "supreme excellence consists in breaking the enemy's resistance without fighting?"<sup>10</sup>

Liddell Hart was most explicit in his philosophy of strategy. With reference to the strategist, he wrote:

His true aim is not so much to seek battle as to seek a strategic situation so advantageous that if it does not of itself produce the decision, its continuation by a battle is sure to achieve this.

In other words, dislocation is the aim of strategy.

According to Hart, dislocation is a psychological state of mind and springs fundamentally from a sense of being trapped. It is achieved as a result of a maneuver which either upsets the enemy dispositions by forcing a sudden change of front; separates his forces; endangers his supplies; or threatens his escape routes.<sup>11</sup>

Had the First World War continued another year, tanks most likely would have been employed to that purpose. A British colonel, J. F. C. Fuller, envisioned the battles of the near future. In a publication (Plan 1919) which he

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<sup>10</sup>Hart, The Sword and the Pen, op. cit., p. 31. Sun Tzu has been described as the earliest writer on the subject of classic warfare. Studied for centuries in China and Japan, his The Art of War was written about 400-320 B.C.

<sup>11</sup>Hart, Strategy, op. cit., pp. 339-40.



described as a novelette, Fuller actually provided the blueprint for all future tank battles. In it, he wrote:

Up to the present the theory of the tactical employment of tanks has been based on trying to harmonize their powers with existing methods of fighting, that is, with infantry and artillery tactics. In fact, the tank idea, which carries with it a revolution in the methods of waging war, has been grafted onto a system it is destined to destroy, in place of being given free scope to develop on its own lines.<sup>12</sup>

Another British pioneer, Brigadier Percy Hobart, described in 1933 the armored clash of the future:

Caution will be rampant . . . We should play on the enemy's fears both by air and mobile force. Threats (or even rumors) of an armored force in his rear, or near mobilization centres at different places; probably little material damage (lorries here and there, detachments of troup, etc.) will be necessary or advisable. We must avoid losing tanks.

When we have played on his nerves sufficiently, and when the preparations for our main strategic stroke are ready, then we strike in combination with all our forces. Tank thrust in this case will be at a vital point, and pushed really home. i.e. We must accept our losses.

But here, as at all times, tank's true role is to ATTACK WEAKNESS. Use the Line of Least Resistance: Speed; Surprise.<sup>13</sup>

In all fairness, it should be mentioned some of the younger French officers, such as Colonel Charles de Gaulle, displayed a keen interest in the new armored doctrines being evangelized in England. De Gaulle even published a

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<sup>12</sup>Kenneth Macksey, Tank Force: Allied Armor in World War II (New York: Ballantine Books, Inc., 1970), p. 9.

<sup>13</sup>Ibid., p. 26.

small book: Vers l'Armee le Metier (roughly translated, About the Army Craft), in which he advocated the concept of armored formations, though with nothing of the force of his British counterparts.

Of the before-mentioned men, perhaps only Liddell Hart really understood how tank forces should be organized. Fuller, though brilliant, certainly overestimated the importance of the tank itself, for which he claimed almost magical power. De Gaulle, while demanding more tanks for the French army, did not seem altogether clear about what he would have done with them had they been granted.

In spite of the numerous publications endorsing armored warfare, some experts predicted the horse would play a vital and possibly decisive role in the next war. They just would not listen.

Only in Germany were the tank enthusiasts not ignored.

## CHAPTER II

### BIRTH OF THE BLITZKRIEG

The memory of crushing tank assaults during 1918 led to Germany's development, twenty years later, of a tank force second to none. While not numerically superior to the Allies, the German panzer divisions would be stronger in technique, and vastly superior in morale.

World War One tank attacks owed as much of their success to psychology as to actual destructive power or maneuvering ability. When a front-line infantryman witnessed the approach of these mechanical monsters, he was faced with a problem for which he had no prior experience in solving. He could either attempt to hold his ground, surrender, or abandon his position. Without the training or weapons to stop tanks, it is not surprising many chose the second and third alternatives.

Although tanks were terror-provoking monstrosities, very few Germans were actually killed by these machines.

Field guns were the greatest threat to early tanks. None could survive a hit from such a gun.

A moving tank was absolute hell inside. The engine quickly heated the interior to more than ninety degrees Fahrenheit. The Rickardo engine poured smoke and



fumes into the interior, causing burning eyes, sore throats, and aching heads. The noise, produced by an exposed engine and straight-teeth gear wheels, was indescribable. Voice communication was impossible and hand signals were difficult to see. The only light came through ports and vision slits.

These infant tanks possessed a maximum speed of only 3.5 miles per hour. Perhaps lack of speed was not undesirable, for there were no springs in the suspension system. The crew compartment was huge by later standards. The engine stood upright in the forward section of the interior. The gearbox was immediately behind. An eight-man crew included four gunners, two gearsmen, a driver, and the commander. The gearsmen, positioned on each side of the power plant, read hand signals from the driver. The tank commander sat to the left of the driver.<sup>1</sup>

There are several accounts of incidents in which tanks were unable to advance, simply because the tanks had physically exhausted their crews.

Before the war ended, Britain had produced over 2,200 tanks. French industry turned out about 4,300, of which 3,500 were light tanks. Germany, by contrast, built

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<sup>1</sup>John Weeks, Men Against Tanks: A History of Anti-Tank Warfare (New York: Mason/Charter Publishers, Inc., 1975), pp. 19-20.



only twenty of the cumbersome (30-ton) A7V "land fortresses."<sup>2</sup>

Following the First World War, Britain and France had the most experience in tank building. In Britain, the Vickers firm led the field in radical new tank design. The French merely beefed up existing, obsolete models. The Italians, satisfied with an improved Vickers design, never compared favorably with either friend or foe. On the other side of the world, the Japanese also were developing basic Vickers designs. However, due to the terrain over which they fought, they had no vital need for first-rate tanks.

The United States, proving unable to produce its own tanks in time, was forced to rely on British and French vehicles. Feeling secure behind two oceans and the illusion of lasting peace, the United States paid little heed to post-war studies. In fact, the National Defense Act of 1920 disbanded the tank corps and merged tanks with infantry. The budget for tanks that year was \$500.<sup>3</sup>

Since so little research was being financed officially, most American military leaders were unaware important advances were quietly being made in their own

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<sup>2</sup>Morris, op. cit., p. 36.

<sup>3</sup>Ibid., p. 46.

backyard. An American, J. Walter Christie, was designing new tanks, complete with a revolutionary suspension system. A few experimental vehicles were created in 1928. Declining a purchase offer by the United States, Christie immediately began work on a more advanced design. In 1931, it appeared. Designated M-1931, it was not only fast, but was amazingly smooth and agile. The United States Army purchased three (less armor, guns, engine, and radio) for \$34,000 each. Despite this apparent interest, the United States was not convinced of armor's value.

Russia was. Believing in the bright future of tank warfare, she purchased two of Christie's M-1931 models. From these, the Russians developed their BT series, the forerunner of the astounding T-34.<sup>4</sup>

Under the masterful supervision of Marshal Tukhachevski, Russia's leading armored expert, a powerful mechanized army was created. However, Stalin's army purge of 1937 deprived the Soviet Union of its more progressive officers. Moreover, the mechanized corps were disbanded, and their tanks scattered among the rifle divisions.<sup>5</sup>

Stalin would live to regret his decision.

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<sup>4</sup>John H. Batchelor and Kenneth Macksey, Tank: A History of the Armored Fighting Vehicle (New York: Charles Scribner's Sons, 1970), pp. 68-69.

<sup>5</sup>Morris, loc. cit.

Germany was forbidden by the Treaty of Versailles to employ tanks in her tiny army. The gigantic Krupp complex was ordered to halt all production of armaments after 1919, though research was allowed to continue. Every cloud has a silver lining, however, and Germany actually profited from these restrictions. Because Germany was denied tanks, there could be no complacency. Unlike in France, there would be no overconfidence generated by having large numbers of obsolete vehicles. Indeed, now more emphasis would be placed on the design and selection of prototypes. Ironically, as Krupp would boast in 1942, "the basic principle of armament and turret design for tanks had already been worked out in 1926."<sup>6</sup>

Prohibited from building tanks, Germany was determined to acquire them somehow.

The Bofors Company of Sweden, under license, produced small numbers of the German LKII tank. Though not a battleworthy machine, the LKII was useful for experimental purposes. Strange as it may seem, most of Germany's early progress was made as a direct result of a secret agreement with the Soviet Union.

With German cooperation, a tank school was established in Russia. Located in Kazan, deep in the Tartar

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<sup>6</sup>William L. Shirer, The Rise and Fall of the Third Reich (New York: Simon and Schuster, Inc., 1960), p. 282.



Republic, it was beyond the scrutiny of the Western powers. These two nations, driven together for lack of other partners, hoped to train soldiers in the new theories of armored warfare. Initially, the Bofors tank was shipped into Russia and assembled at Kazan. However, it was never considered satisfactory. In 1930, the Russians purchased for Germany a Carden-Loyd light tank from Britain. This event would be a milestone.

Back in Britain, Colonel Charles Broad put the finishing touches on his pamphlet, entitled Mechanized and Armoured Formations. As the official report on British tank experiments, it was given a restricted circulation in 1929. Later, its contents leaked to the press, and eventually were reproduced in their entirety in Germany.<sup>7</sup>

While it is generally assumed the Germans borrowed their ideas on armored warfare from the British theorists, many German writers disagree. Major General F. W. Von Mellenthin does not deny the value of British pioneering, but points out that by 1929, German theory had surpassed that of Britain. Furthermore, with the exception of Liddell Hart, the British never forcefully stressed the need for cooperation among all elements within the armored division.<sup>8</sup>

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<sup>7</sup>Morris, op. cit., pp. 42-44.

<sup>8</sup>F. W. Von Mellenthin, Panzer Battles: A Study of the Employment of Armor in the Second World War, ed. L. C. F. Turner, Trans. H. Betzler (London: Cassell and Co., Ltd., 1955), p. xv.



The most celebrated of the German tank advocates was Major Heinz Guderian. In 1929, he wrote:

I became convinced that tanks working on their own or in conjunction with infantry could never achieve decisive importance. My historical studies, the exercises carried out in England, and our experiences with mock-ups had persuaded me that tanks would never be able to produce their full effect until the other weapons on whose support they must inevitably rely were brought up to their standard of speed and of cross-country performance. In such a formation of all arms, the tanks must play the primary role, the other weapons being subordinated to the requirements of the armor.<sup>9</sup>

Both Guderian and Hart realized the tank's value lay in combination with other weapons, but Guderian saw more clearly than Hart that the vital element of that combination would be furnished by air power.

In the early Thirties, as a result of insistent urging by Guderian and a few others, the German High Command finally recognized the theory of high-speed warfare. Reluctantly, they agreed to give it a trial. Germany's primary need for mechanized armament was concentrated upon vehicles which could be manufactured quickly and in large numbers, for there was a whole new generation of soldiers to be trained.

First, however, the Treaty of Versailles had to be circumvented. If tanks were to be built, some guise

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<sup>9</sup>Heinz Guderian, Panzer Leader, trans. Constantine Fitzgibbon (New York: E. P. Dutton and Co., Inc., 1952), p. 24.

had to be produced to hide the truth. Besides, the selection, design, and manufacture of suitable vehicles was a highly complex task that lay almost outside the experience and capability of German industry.

Answering the challenge, the Krupp firm adapted a British Carden-Loyd vehicle and disguised it under the name "agricultural tractor." Introduced secretly into service in 1934, it became known as Panzerkampfwagen (armored battle vehicle) I, or simply Mark I.<sup>10</sup>

Before Mark I was deployed, the Germans trained with cardboard mock-ups mounted on bicycle wheels.<sup>11</sup> Later, the Allies relaxed the restrictions imposed by the Versailles agreement, allowing open deployment of tanks.

Even during the mid-1930's, there was still considerable opposition to the formation of a separate armored force. Guderian's most formidable opponent was General Ludwig Beck, the Chief of Staff. Like the French, he wanted to deploy tanks in close support of the infantry. However, Guderian, backed by Generals Blomberg and Fritsch, successfully overcame the Beck factions.<sup>12</sup>

By 1937, Guderian's theories were sufficiently molded for him to feel ready to present them publicly. In

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<sup>10</sup>Ibid., p. 28.

<sup>11</sup>Andrew Kershaw, ed., Tanks At War: 1939-1945 (New York: Marshall Cavendish Corp., 1975), p. 6.

<sup>12</sup>Mellenthin, op. cit., p. xvii.

a short book, entitled Achtung! Panzer! (Attention! Tanks!), he outlined his ideas for successful tank operations. His book subscribed to the normal methods of achieving surprise, yet denied large panzer formations should be introduced merely for surprise. Guderian knew their contribution would be much larger.

We believe that by attacking with tanks we can achieve a higher rate of movement than has been hitherto obtainable, and . . . what is perhaps more important . . . that we can keep moving once a breakthrough has been made.

If the attack is carried out with sufficient concentration, width and depth we shall destroy recognizable targets as they present themselves and thus drive a hole in the enemy's defenses through which our reserves can follow more speedily than was possible in 1918.<sup>13</sup>

Guderian foresaw the necessity for two types of tanks: a light one for reconnaissance; and a medium one as the main battle implement.

His views on tank warfare were born of pure theory and grew out of his study of transport and supply problems. It is even more remarkable he reached the conclusions he did, for Guderian did not even see the inside of a tank until some years after the war.<sup>14</sup>

The reorganization began with the Motorized Troops Command becoming the Armored Troops Command. Three panzer divisions were created, the second commanded by Guderian, himself. Each was established with a tank brigade (562

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<sup>13</sup>Guderian, op. cit., pp. 41-42.

<sup>14</sup>Ibid., p. 27.



tanks, later reduced to 276-324), a reconnaissance battalion, an infantry brigade, a field artillery regiment, and various support units. All components were motorized.

Still, things did not go smoothly at first. The Fourth Panzer Brigade was delegated to infantry support, while others were assigned to screening duty.

Germany's takeover of Austria in 1938 amplified not only the mechanical difficulties of tanks, but the advantages of their long-range mobility as well. Guderian's Second Panzer Division covered 420 miles (about 675 kilometers) in forty-eight hours. Highly impressed, Hitler ordered the formation of two more panzer divisions, the Fourth and Fifth. Soon afterward, he assumed personal command of the armed forces.<sup>15</sup>

Even though his ideas at first had not been fully accepted, Guderian had risen rapidly in rank. Immediately following German occupation of the Sudetenland, Guderian was promoted to full general. The average age of a colonel

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<sup>15</sup>Eric Grove, World War II Tanks: The Axis Powers (London: Orbis Publishing Ltd., 1975), p. 4. General Werner von Fritsch and Field Marshal Werner von Blomberg held the offices of Army Commander in Chief and Commander in Chief of the Armed Forces, respectively. Both officers opposed Hitler's defiant policies and, in what may or may not have been a coincidence, both were involved in sex scandals that led to their dismissal. Fritsch was replaced by Field Marshal Walther von Brauchitsch and Hitler assumed the post of Commander in Chief, an authority he had long desired.

in the Reichwehr had been 52. In 1938, Guderian was only 50 years old. The promotion to general carried with it a new appointment, that of Commander of Mobile Troops (a supervisory post overseeing the development of panzer divisions, "light" divisions, and cavalry).<sup>16</sup>

Although most laymen assume the quality of German tanks was always superior to that of their opponents, the opposite was often true. Many times, only the skill and daring of the panzer crews saved them. Sometimes, as we shall see, even this was not enough.

The 5.5 ton Mark I, often called the "Father of Panzers," was only fit for training purposes. With thin armor and only two machine guns for armament, it was unworthy for battle. However, in its day, the mere sight and sound of an aggressively handled armored vehicle had repercussions on morale which far outweighed its actual combat value.

Slightly more useful was the Mark II, which weighed 10 tons but possessed only a 20 mm. gun. Mark III and Mark IV, weighing in at 15 and 17.3 tons, respectively, were the most capable of the early German tanks. The former was armed with a 37 mm. gun, although high-ranking panzer leaders had asked for a 50 mm. gun. Nevertheless,

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<sup>16</sup>John Keegan, Guderian (New York: Ballantine Books, Inc., 1973), p. 58.

since the 37 mm. weapons were already being manufactured for the Army, the request was denied. The armament for the latter was a low-velocity 75 mm. gun.

The Mark II light tank, along with the Mark I, formed the backbone of the German panzer forces until well after the beginning of the war. This was unavoidable, for the next generation of tanks, Mark III and IV, were delayed in production. In fact, as of September 1, 1939, out of the 3,195 German tanks, only 98 were Mark III's and only 211 were the powerful Mark IV's.

Initially, no German tank boasted of armor exceeding 30 mm. of steel. This made them particularly vulnerable to penetration by the 37 mm. and 47 mm. anti-tank guns being adopted by other armies. In spite of this, German experts believed fast-moving (up to 25 m.p.h.) formations could overcome anti-tank defenses. They trusted the speed of a mass attack would not allow for sufficient time to concentrate defensive firepower.<sup>17</sup>

Following the Munich Conference in 1938, the Czech army was disbanded and its modern equipment eagerly seized by the Wehrmacht. Most sought after were the tanks from the Skoda Works in Pilsen--some 336 35-T's and 38-T's. Both armed with 37 mm. guns, they had been developed over

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<sup>17</sup>Kenneth Macksey, Panzer Division: The Mailed Fist (New York: Ballantine Books, Inc., 1968), p. 13.



several years into excellent light tanks. They were used to equip the newly formed Seventh and Eighth panzer divisions during the "Phony War" of winter, 1939-40.<sup>18</sup> And because the Skoda Works also largely supplied the armies of Yugoslavia and Rumania, German acquisition put pressure on those nations.

Hitler's strategy was working. Since the German reoccupation of the Saar, he had compiled an impressive list of bloodless conquests. By threats, deception, broken promises, and finally, open warfare, he would acquire domination over lands so vast as to rank him with such conquerors as Napoleon, Frederick the Great, and Julius Caesar. However, his real genius was not military, but in his ability to understand and manipulate his enemies. Firmly opposed to the theories of Clausewitz, Hitler wrote:

People have killed only when they could not achieve their aim in other ways . . . . .

There is a broadened strategy, with intellectual weapons. Why should I demoralize the enemy by military means if I can do so better and more cheaply in other ways.

Our strategy is to destroy the enemy from within, to conquer him through himself.

The object was to make the enemy capitulate. If his will to resist could be paralysed, killing was

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<sup>18</sup> Eddy Bauer, The Marshall Cavendish Illustrated Encyclopedia of World War II, Vol. I, Hitler's War, ed. Christopher Chant (New York: Marshall Cavendish Corp., 1972), p. 27.

superfluous--besides being a clumsy and expensive way<sup>19</sup> of attaining the object.

Insight such as this assured Guderian of Hitler's support. As a result, Germany adopted the concept of high-speed mechanized warfare. Unlike the British, who chose not to employ the theories of Liddell Hart and others, the Germans regarded panzer divisions as self-sufficient formations capable of piercing the front as well as exploiting the breakthrough.

Very little practical experience in this theory was gained by the German armored forces during the Spanish Civil War, simply because the equipment did not exist in quantity. Only small-scale cooperation between armor and air could take place, but it was enough to encourage the German military.

In July of 1936, the Spanish Army, led by Francisco Franco, revolted against the young Spanish Republic. Charging the government was becoming communistic, the Army was soon openly backed by Germany and Italy. While Hitler and Mussolini sent troops and weapons to aid the Fascist-led rebels, Russia sent technicians (all operating under aliases) and weapons (including about 700 tanks) to the Loyalists. By the war's end, an estimated 40 percent of Franco's forces were German or Italian.<sup>20</sup>

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<sup>19</sup>Hart, *Strategy*, *op. cit.*, pp. 225-235.

<sup>20</sup>David G. McCullough, ed., *The American Heritage Picture History of World War II* (New York: American Heritage Publishing Co., 1966), p. 41.

The Loyalists, out-gunned, out-maneuvered, and hard-pressed, could not hope to overpower the forces of the Fascist powers. Necessity being the mother of invention, they improvised. It was the Spanish Civil War that produced the "Molotov Cocktail." A mixture of petrol or benzine, water and phosphorous, a "Molotov" was dangerous to carry and to throw. A piece of rubber was added to make a sticky jelly with the benzine. Kept in bottles, the "Cocktail" was shaken vigorously before throwing. Upon striking a hard surface, the bottle smashed, the phosphorous ignited in the air and the benzine flared brightly.

While the "Molotov Cocktail" was risky to handle, the satchel charge was even more dangerous. Invented by the Asturian miners of Northern Spain, it was usually fatal to the thrower as well as to the tank at which it was thrown. For mutual safety, tank formations became more cooperative and less reckless. Perhaps they became too cautious, for tank units became quite easy to deceive. One quite famous example occurred during a Loyalist retreat.

It was imperative a column of Italian light tanks be slowed, for they were threatening to annihilate the withdrawing forces. Late in the day, a line was stretched across a village street, several feet above the ground. Blankets were hung on it, giving the appearance of a solid wall. Italian tank crews, reluctant to approach, held back and opened fire. Machine gun bullets had no effect. A



medium tank was brought up, but its shell apparently failed to penetrate. After about one-half hour of frustrated bombardment, a shot cut the line and the screen fell. Gingerly, the tanks moved forward, with the enemy now miles away.<sup>21</sup>

Both Germany and Italy profited from experience gained under actual combat conditions in Spain. However, while the Germans used the opportunity to iron out difficulties, the Italians did not. Satisfied with their success in the Spanish Civil War, the Italians assumed the same weapons and tactics would prevail in the future. Military experts in Germany, on the other hand, amassed knowledge on which to base improvements for the next generation of weapons.

The armored wing of the Italian Army was never really developed. Their early L3-35 weighed only 3.5 tons and was lightly armored. Manned by a crew of only two men, this vehicle was more correctly called a machine gun carrier (sometimes equipped with a flame thrower) for its sole defense was two machine guns.<sup>22</sup>

In England, too, tank development was lagging, though not so much as in Italy. Worse, production was slow;

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<sup>21</sup>Weeks, op. cit., pp. 30-32.

<sup>22</sup>Bauer, op. cit., p. 42.

for between August, 1938 and September, 1939, the Skoda Works alone produced almost as many tanks as the total British output for the same period.<sup>23</sup>

The failure of the British to rearm prior to World War Two is evidenced all too clearly in this report from now-Lieutenant General Sir Charles Broad:

In 1938 I was senior umpire on an exercise in Britain when the tanks were mainly old and in small numbers, while the anti-tank guns were represented by green flags waved by the umpires and jocularly known as the dominant arm! I was accosted by the German Military Attache and told I ought to come clean, instead of keeping everything hidden; he simply didn't believe that we were as defenseless as we seemed to be.<sup>24</sup>

Dangerously complacent in their role as the dominant power of Europe in 1938, the French had banked on the reputation of their large army to intimidate the Germans during the Twenties. Convinced by the Great War days of quick victories were gone forever, they did feel tanks fulfilled a need on the modern battlefield. To the French, that need was infantry support.

The French Char B (Tank B), leisurely begun in 1921, was intended to satisfy this requirement. It was well-armored, well-armed, and reasonably agile. Weighing 32 tons

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<sup>23</sup>Winston S. Churchill, The Second World War, Vol. I, The Gathering Storm (Boston: Houghton Mifflin Co., 1948), p. 301.

<sup>24</sup>Macksey, Tank, op. cit., p. 7.

and plated with 60 mm. of armor, the Char B was considerably heavier than its eventual German counterparts. It boasted of two guns, a 75 mm. mounted in the hull, and a 47 mm. in the turret.<sup>25</sup> However, the one-man turret presented a problem in itself, for its occupant was not only the commander of the tank, but had to load the turret gun as well. (The two or three-man turret layout in the German tanks gave them a distinct advantage.) Moreover, the 75 mm. gun could only be aimed by turning the tank. Therefore, if the Char B was immobilized, it became all but defenseless, while another tank might swing its turret and fight on.

The 20-ton Somua also carried a 47 mm. gun in its one-man turret. But that gun, along with a single machine gun, constituted its whole armament. The armor of Somua, between 40 mm. and 60 mm. thick, was roughly double that of German tanks.<sup>26</sup> Nevertheless, French superiority in armor protection and in the size of their army would not prove to be a decisive advantage. In fact, Hitler's armies, far from having the overwhelming superiority with which they are usually credited, were actually inferior in numbers to those opposing them in 1940. And although his

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<sup>25</sup>Batchelor and Macksey, op. cit., pp. 60-61.

<sup>26</sup>John Williams, France: Summer 1940 (New York: Ballantine Books, Inc., 1969), p. 62.



armored drives proved decisive, his tanks were fewer in number and less powerful than those possessed by the French and British. Only in airpower, the most critical factor, did he have an advantage.

Back in the United States, development of new tanks was slow starting. Official American studies netted no satisfactory results, and for some reason, the Christie prototypes were never developed. Therefore, the Americans looked to the British and Germans for design and philosophy. At first, her industry produced only light tanks. The most advanced medium tank prototype was the M-2, A1, with only a 37 mm. gun and 25 mm. of armor.<sup>27</sup> Later American tanks will be discussed upon that nation's entry into the war against Germany.

British tank production lagged before 1940. This was due both to appeasement and to tight budgets. Most of those produced were built to specifications whose only virtue was economy of cost.

As war loomed more probable, the British General Staff introduced a tank designed to resist the fire of current anti-tank guns, yet retain the ability to destroy hostile tanks. At 26 tons, its 80 mm. of armor plate was impervious to any German tank gun in 1940. Designated

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<sup>27</sup>Macksey, Tank, op. cit., p. 63.

Matilda II, this tank would win the diminutive "Queen of the Battlefield" in North Africa.<sup>28</sup> Nonetheless, more powerful anti-tank guns defeated its armor about the same time its small 40 mm. gun could no longer penetrate up-armored enemy tanks. Worse still, the small cast turret and hull (which taxed the capacity of English steel foundries to the full) was incapable of being up-armored to improve protection or enlarged in order to carry a bigger gun. In other words, Matilda failed to pass the test of longevity passed so convincingly by later Russian designs.

From the beginning, the German panzer soldiers were selected by merit. Their quality in aptitude was second only to members of the Luftwaffe. They felt and acted like an elite and were distinguished from other soldiers by their special black uniform and floppy black beret. Each was familiar with the duties of his teammates in the tank. The basic trades were driver, gunner, and radio operator. Along with the commander and the later addition of a gun loader, they comprised the five-man crew so common toward the end of the war.<sup>29</sup>

As previously mentioned, Germany possessed some 3,200 tanks on September 1, 1939. By contrast, Poland

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<sup>28</sup>Ibid., p. 41.

<sup>29</sup>Macksey, Panzer, loc. cit.

had only 600. In artillery pieces, Germany had an advantage of over three to one (4,300--1,350). Poland was not overwhelmingly outnumbered in manpower, however, as Germany fielded an army of one and one-half million men compared to the one million soldiers mobilized by Poland.<sup>30</sup> Some will take issue with this last statement, but history proves the fallacy of the assumption battles are won with mere numbers of men. The first and foremost advantage pressed by the Germans was the Luftwaffe. With 1,929 aircraft at his disposal, Hitler would make quick work of the 842-plane Polish air force. The proud Luftwaffe, confident in their combat prowess, warmed to the task at hand. Within two days, the Polish air force had been annihilated. Most aircraft never left the ground.

Air power, combined with the mechanized forces, created the blitzkrieg. While armor lacks the vaulting power of the air force, it does have the ability to remain in the conquered areas. German air supremacy allowed the panzer units to roll freely, without fear of air attack. They clanked deep into the Polish rear, striking for the enemy's nerve centers: highway and rail junctions; bridges; airfields; and centers of communication. Speed was the overriding element. If an attack on a fortified enemy position could be averted by circumvention, the

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<sup>30</sup>Bauer, op. cit., p. 103.



result could have a paralyzing effect on the defenders. Unarmored infantry merely hampered the pace of advance.

In Warsaw, the Germans discovered tanks to be ineffective, for city streets severely limited their maneuverability.<sup>31</sup> The lesson was taught, but soon to be forgotten. Only three years later, the Germans would be at the gates of Stalingrad.

The German High Command was apprehensive prior to the Polish invasion because their plan of action was largely untried. Failure to achieve swift victory would surely lead to a long struggle with the Western powers. Success meant confidence for the future. The Germans were well-rehearsed. Occupation maneuvers in Austria and Czechoslovakia had helped to iron out mechanical and logistical problems, while experience in the Spanish Civil War had honed the panzer and air forces to a razor edge.

Generally speaking, the Polish campaign indicated planning and method was more than equal to the type of static defenses fabricated by the conventional armies of the day.

Western powers assumed Poland's military weaknesses were the prime cause of collapse. However, since no outside observation was allowed, the potency of the panzer units remained concealed to the West.

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<sup>31</sup>New York Times, September 12, 1939, p. 1; cols. 7-8.

On September 5, Hitler visited Guderian's sector in Poland. Asked his opinion on the progress of the panzers, Guderian responded he was essentially pleased. However, he stressed the urgent need the Mark III and Mark IV be up-armored and up-gunned. On the other hand, he added that "tanks are a lifesaving weapon."<sup>32</sup>

In light of the campaign statistics, this observation seems true. Almost 700,000 Poles were taken prisoner by the Germans. Thousands more were killed or wounded. German losses amounted to 10,572 killed in action, 3,400 missing (presumed dead), and 30,322 wounded. These figures, broadcast by Hitler on September 30, were guessed to be accurate by the Allies.<sup>33</sup>

Timid action by the French facing the Siegfried Line permitted Germany to complete what many generals felt was a dangerous gamble. In other words, the Germans had involved themselves in an Eastern conflict with the West yet unconquered. Hitler's Siegfried Line, largely uncompleted at the time, was constructed "of a minimum of concrete and a maximum of propaganda." In the West, one hundred and ten Allied divisions (mostly French) were opposed by only twenty-three second-class German divisions.

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<sup>32</sup>Guderian, op. cit., p. 156.

<sup>33</sup>Bauer, op. cit., p. 111.

To feel out the German strength, the French sent a few strong patrols into the enemy lines. Meeting stiff resistance, the French settled back to wait.<sup>34</sup>

In the "phony war" which followed the fall of Poland, the Germans quietly moved units to their western frontier.

The Allies had lost their last chance.

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<sup>34</sup>McCullough, op. cit., p. 66.



## CHAPTER III

### SWASTIKA OVER EUROPE

All evidence supports the assumption French and British leaders alike believed they might still find a way out without fighting. Although both nations had declared war on Germany only two days after the hostilities in Poland began, neither had made more than token threats against Germany. Even along the Western Front itself, opposing soldiers often moved and rested within full view of each other.

France had been obsessed with defending its frontier against the Germans since the Franco-Prussia War of 1870. This concern led to the building of the mighty Maginot Line, immensely expensive and militarily outdated. Belief this vast system of fortifications could shut the Germans out of France created what historians call the "Maginot Mentality." Throughout the winter, optimism for peace continued to grow.

Peace, indeed! As if to dash the Allies' hopes, Hitler struck early in spring. On April 9, 1940, German forces overran Denmark and invaded Norway. Though tanks played an insignificant role in these campaigns, classic strategy was being put to full use. Both nations were undermined by Nazi agents, thereby reducing their power to

resist. Had not Philip of Macedon claimed he could overcome any fortress wherein he could introduce a wagon laden with gold?<sup>1</sup>

Convinced now invasion was imminent, the Allies foolishly chose to wait. Hitler would again be granted the element of surprise. France, though physically mobilized for war, lacked the national unity and determination necessary for victory.

The biggest difference between the land forces of Germany and those of France was in the motorized and armored divisions on each side. While the French had seven motorized divisions compared to only four for Germany, they had nothing to resemble Germany's ten panzer divisions. The French formed brigades equipped with heavy tanks (Char B's), but because they could not be provided with adequate air protection, General Maurice Gamelin refused to create division-size units. On the other hand, the German panzer division was the basic unit, with two being combined to make an armored corps.

When Germany finally invaded the west on May 10, 1940, the French possessed some 3,168 tanks. Added to this total were numerous support vehicles and a reserve of

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<sup>1</sup>Anatole G. Mazour and John M. Peoples, Men and Nations (New York: Harcourt, Brace and World, Inc., 1968), pp. 103-4.

obsolete fighting machines. Counting the British armor on the continent (consisting of light and medium tanks), and several hundred others pegged for shipment, the Allied total topped 3,800.<sup>2</sup>

Official German documents confirm only 2,439 tanks were used in the attack on France and the Low Countries. They were categorized as follows:

523 . . . . .	Mark I
955 . . . . .	Mark II
349 . . . . .	Mark III
278 . . . . .	Mark IV
106 . . . . .	Czech-made 35-T
228 . . . . .	Czech-made 38-T <sup>3</sup>

Accordingly, although the Allies possessed considerably larger numbers of tanks than the Germans, their negative strategy cancelled the advantage. The Allies dispersed their tanks over the entire defense line, including the Maginot system.

Germany, by contrast, massed her armor for a slashing stroke through the most weakly defended section of the Allied frontier, the Ardennes Forest. Certainly a formidable barrier, the Ardennes seemed to be the least

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<sup>2</sup>Macksey, Tank, op. cit., p. 41.

<sup>3</sup>Guderian, op. cit., p. 472.



likely target the Germans would hit. However, like any natural barrier, it can be conquered if thorough preparations are made. Hannibal demonstrated that fact over two thousand years ago.

Fearing the recognized French superiority in heavy artillery, the German High Command expressed serious doubts about their chances for success. Hitler, in defense of his plan, argued that "these weapons are of no decisive significance whatsoever in mobile warfare."<sup>4</sup> It is possible he was familiar with Niccolo Machiavelli's The Art of War. Artillery, in its infancy during the Sixteenth Century, was prophesied to dominate the wars of the future. Yet, Machiavelli had written: "Artillery, in my opinion, does not make it impossible to use ancient methods and show ancient vigor."<sup>5</sup>

When the panzers broke through the Ardennes and crossed the Meuse River, they did not pause to wait for their heavy artillery. Instead, they struck out across the flatlands of northern France, heading for the Channel coast.<sup>6</sup>

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<sup>4</sup>Hart, Strategy, op. cit., p. 241.

<sup>5</sup>Hart, The Sword and the Pen, op. cit., pp. 73-77. Although Machiavelli is usually considered to be a political writer, his experience in military affairs was extensive. In 1509, troops under his command captured Pisa. He fought with the papal armies against Charles V until the fall of Rome in 1527. He died the same year.

<sup>6</sup>Kershaw, op. cit., p. 14.

The swiftness and daring of the advance was made possible by the deadly effectiveness of the Luftwaffe.

Although the first round belonged to Germany, the thrust was extremely vulnerable on its flanks. Yet, the same attitude which created the situation prevented its remedy. The French counterthrust was to be delayed until all available armor was assembled. At this critical point, the French High Command proved unable to exercise effective control.

And then it was too late.

Had France been defeated on the field of battle? Not really. The following, from Antoine de Jomini's Precis de l'Art de la Guerre, summarizes the plight of France:

Battles have been stated by some writers to be the chief and deciding features of war. This assertion is not strictly true, as armies have been destroyed by strategic operations without the occurrence of pitched battles, merely by a succession of inconsiderable affairs.

It is the morale of armies, as well as of nations, more than anything else, which makes victories and their results decisive.<sup>7</sup>

To oversimplify somewhat, the Allies were beaten because they believed that they had been beaten. While the fact remained the Luftwaffe was supreme in the skies over France, air power alone did not bring that nation to her knees.

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<sup>7</sup>Hart, op. cit., p. 173.

Much controversy has surrounded the events concerning Dunkirk. Many charges have been traded as to why the panzers were pulled from the line, presumably allowing the British Expeditionary Force to escape. However, in light of the following logic, it would be difficult to criticize Hitler's decision.

First of all, the Allies were cut off by land and no one anticipated such a miraculous evacuation. Second, Guderian himself on May 28 reported to Hitler the terrain around Dunkirk was unsuited to tanks. To strengthen the argument, Hermann Goering assured his Führer the Luftwaffe could bomb the British into surrender. Finally, the Channel drive had reduced German tank strength to a dangerous level. Refitting was of the top priority, for the battle for France was at hand.<sup>8</sup>

Within a month, it was over.

Of the German success, Lord Viscount Gort (commander of the B. E. F.) stated it "emphasized even more fully than in the campaigns of the past the advantage which accrues to the commander who knows how to use time and make time his servant and not his master."<sup>9</sup>

Major General F. W. Von Mellenthin of Germany would agree.

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<sup>8</sup>Morris, op. cit., p. 64.

<sup>9</sup>Ibid.



Time and time again the rapid movements and flexible handling of our panzers bewildered the enemy. The use of our parachute troops in Holland also illustrates the paralyzing effect of a surprise blow.<sup>10</sup>

I must emphasize that the German victories of May, 1940, were due primarily to skillful application of the two great principles of war--surprise and concentration.<sup>11</sup>

With the exception of the still defiant Britain, the war in the West was over. However, after Dunkirk, there were fewer than 200 tanks available for the defense of Britain.<sup>12</sup>

Although it may seem as if the British were defenseless in the summer of 1940, they did have a "very effective anti-tank ditch."<sup>13</sup> This, of course, refers to the English Channel. Faced with the Channel and the Royal Air Force, the panzers were thwarted at last. Germany suffered heavy tank losses in France. The Mark III's and IV's performed creditably except when opposed by Matildas or heavy French tanks. It was apparent to panzer leaders that up-gunning and up-armoring was of the utmost importance.

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<sup>10</sup>Mellenthin, op. cit., p. 24.

<sup>11</sup>Ibid., p. 12.

<sup>12</sup>Morris, loc. cit.

<sup>13</sup>Robert Leckie, The Story of World War II (New York: Random House, Inc., 1964), p. 46.

British light tanks were as vulnerable as their German counterparts, but their 100 infantry tanks (including twenty-three new Matildas) were covered by more than 70 mm. of armor--proof against German anti-tank guns. At the same time, Matilda's two-pounder gun could penetrate any German tank at battle ranges.<sup>14</sup>

The shock administered by the British Matilda went far toward initiating the up-gunning program so long sought by panzer leaders. Furthermore, both Mark III and Mark IV were to be up-armored. Hitler directed the Mark III's 37 mm. gun be replaced with a high-velocity 50 mm. gun. However, the Army Ordinance Office, without consulting its Führer, watered down his instructions--substituting a short, low-velocity 50 mm. gun. Hitler never forgave those responsible. His anger was excusable, for this disobedience went far to lose the war for Germany.<sup>15</sup>

For the year 1940, German new tank production of all types came to slightly over one thousand. Meanwhile, a number of obsolete vehicles--mostly Mark I's, and including some Czech and French types--were being adapted to carry non-turreted armament.<sup>16</sup> These limited traverse guns, when mounted on a tracked chassis, became known as

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<sup>14</sup>Macksey, Panzer, op. cit., p. 52.

<sup>15</sup>Mellenthin, op. cit., p. 155.

<sup>16</sup>Macksey, loc. cit.

assault guns. Manned by artillery units instead of panzer soldiers, these machines were generally found in support of infantry divisions, and are not considered tanks.

Studies had begun on radically more powerful tanks--medium and heavy--in 1937 and 1939, respectively.<sup>17</sup> Early battle successes, however, had blinded the Germans to the urgency of the task. Another year would go by before the Germans saw the necessity.

After the initial shock of blitzkrieg had worn off, every effort was made to reduce the terror associated with tanks. British soldiers heard accounts of incidents where tanks were halted or delayed by lightly-armed and quick-witted soldiers. Several such incidents were taken from the annals of the Spanish Civil War. Another told of a British company commander (in France) who gained a thirty-minute respite by placing five soup plates upside-down on the road. German tank crews, believing the plates to be mines, made a lengthy detour.<sup>18</sup>

Whether the account is factual or not is not important. The purpose would be served merely by reassuring soldiers tanks are only machines. For, as the British Home Guard lectures emphasized in 1940, a tank's weakest point is always the minds of the men inside it.<sup>19</sup>

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<sup>17</sup>Ibid.

<sup>18</sup>Weeks, op. cit., p. 41.

<sup>19</sup>Ibid., p. 36.



Meanwhile, as the "Battle of Britain" grew to a raging storm, British soldiers in Egypt felt fortunate to be "safe at the front."

The "Desert Gallop" of the British Army of the Nile (commanded by General Sir Archibald Wavell) during late 1940 chased the Italians from their positions just inside Egypt. The Italian defeats in North Africa, Ethiopia, and Greece threatened to cause a crisis in Italy, possibly cracking the "Pact of Steel." This fear led Hitler to create the now-famous Afrika Korps. Its commander, Erwin Rommel, was a hero of the Ardennes breakthrough. Handsome and dashing, he understood thoroughly Guderian's principles and adapted them to desert conditions. Usually outnumbered but seldom outfought, Rommel did have two advantages over the British--better quality tanks and superior anti-tank guns.

While German tanks could kill at 1,000 yards, British tanks were forced to close to 800 yards before they could score a decisive hit.<sup>20</sup>

As late as November of 1941, the Afrika Korps had only thirty-five 88 mm. guns. However, these were kept close to the panzers to insure maximum effect against British tanks.<sup>21</sup> The dual purpose (anti-aircraft or

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<sup>20</sup> Morris, op. cit., p. 73.

<sup>21</sup> Mellenthin, op. cit., p. 55.

anti-tank) 88 mm. gun was the most powerful gun, but the 50 mm. Pak (Panzerabwehrkanone) 38 was more useful. The Pak 38 was not only effective, but was easy to conceal.

When a German tank patrol, upon making contact with British armor, found itself outnumbered (which was common), it would retire. The British would almost invariably give chase. The withdrawing panzers led their enemy directly into range of hidden and strategically-located Pak 38's. From virtually point-blank range, the guns extracted their deadly toll.<sup>22</sup>

With Rommel on the scene, the vital Suez Canal was threatened as never before, though the battle in North Africa eventually settled into a seesaw affair.

Hitler's spring campaign of 1941 added Yugoslavia, Greece, and Crete to his list of victims. The German combination of armor and air power operated with the pulverizing thoroughness of old, though the typically mountainous terrain somewhat limited panzer movements. The Balkan campaign ended swiftly for the invaded nations were outmanned and underarmed. Nonetheless, precious time was lost. Because Hitler used the first warm weeks of spring to secure his southern flank, he was compelled to delay his planned invasion of Russia. Code-named "Barbarossa," the attack would not begin until June 22, 1941.

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<sup>22</sup>Morris, op. cit., p. 74.

Many historians are still asking themselves why Hitler attacked the Soviet Union. With Britain still defiant, it seemed a foolish thing to do. However, Hitler hated Slavs and Bolshevism. In addition, he felt Russia's very existence gave Britain courage to fight on.

At an Army chief meeting on July 31, 1940, Hitler had announced for the first time his decision concerning Russia.

If Russia is smashed, Britain's last hope will be shattered. Then Germany will be master of Europe and the Balkans.

Decision: In view of these considerations, Russia must be liquidated. Spring, 1941.

The sooner Russia is smashed, the better.<sup>23</sup>

In Führer Directive No. 21, dated December 18, 1940, Hitler wrote:

The German Armed Forces must be prepared to crush Soviet Russia in a quick campaign before the end of the war against England. For this purpose the Army will have to employ all available units with the reservation that the occupied territories will have to be safeguarded against surprise attacks.

Preparations . . . . . are to be completed by May 15, 1941. Great caution has to be exercised that the intention of an attack will not be recognized.

Destined to be an armored struggle, Hitler's general aim of "Barbarossa" was that "the mass of the Russian Army in western Russia is to be destroyed in daring operations by driving forward deep armored wedges."<sup>24</sup>

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<sup>23</sup>Shirer, *op. cit.*, pp. 797-98. General Franz Halder, Army Chief of Staff, was present and took down in shorthand Hitler's exact words.

<sup>24</sup>*Ibid.*, pp. 810-11.



Shortly after 3:30 a.m. on June 22, German troops jumped off from their starting points along a two thousand mile front. "Barbarossa" was finally under way. All along the front, the Russian defenses collapsed.<sup>25</sup>

In Mein Kampf and in his speeches, Hitler had always asserted the natural and unchangeable Teutonic superiority over Slavs. Perhaps he was influenced by memories of Russia's performance during World War One, and on whose front Germany had won her greatest victories. Nevertheless, even Hitler recognized the trump cards held by the Soviets. Her advantages of almost unlimited manpower and vast expanses of land could, he knew, bleed an invader white. He was also aware the annual periods of bottomless mud and unbearably cold weather in Russia could severely limit panzer movements. In fact, some panzer leaders declared the major obstacle to quick success was the primitive Russian road system.

Hitler knew these advantages would tell on an invader in the long run, but he did not intend there should be a long run. Soon after the invasion began, Hitler announced:

We have only to kick in the front door, and the whole rotten Russian edifice will come crashing down.<sup>26</sup>

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<sup>25</sup>New York Times, June 22, 1941, p. 1, col. 8.

<sup>26</sup>John Keegan, Barbarossa: Invasion of Russia (New York: Ballantine Books, Inc., 1970), p. 8.

As German victories began to mount, and prisoners streamed in by the thousands, Hitler's prediction Russia would fall in six weeks began to appear modest.

There are several reasons for Russia's poor showing, initially. Stalin's purge of 1937 had dumped many of his ablest generals. After the Finnish debacle and Germany's successes in Poland and in the West, however, a large number of purged officers were reinstated. Nonetheless, a great deal of organizational damage already had been done. In addition, evidence gathered by Russian observers during the Spanish Civil war was misinterpreted by the General Staff. As a result, General Budenny disbanded his large armored formations and redistributed the tanks among the infantry.

Finally, the Russians were caught largely by surprise. This was due partly to German precautions, but mainly to Stalin's stubborn faith Hitler would honor their Non-Aggression Pact.

In June of 1941, Russia possessed some 21,000 tanks--more than four times the number the Germans had--but few were of recent vintage.<sup>27</sup>

As the war progressed, Russia's seemingly endless supply of tanks caused Hitler to make the following remarkable admission (to Guderian):

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<sup>27</sup> McCullough, op. cit., p. 250.

If I had known that the figures for Russian tank strength which you gave in your book (Achtung! Panzer!) were in fact the true ones, I would not--I believe--ever have started this war.<sup>28</sup>

When "Barbarossa" commenced, German tank strength was as follows:

1,893 . . . Mark III's with a low-velocity 50 mm. gun  
 1,132 . . . Mark IV's with a low-velocity 75 mm. gun  
 131 . . . Mark II's with the outmoded 37 mm. gun  
 40 . . . Mark III's with a high-velocity 50 mm. gun<sup>29</sup>

Germany figured to have a small superiority in manpower, at first. German intelligence also had predicted a distinct advantage in numbers of armored units and a slight edge in overall quality of equipment.

Reckoning Russia had only twenty-eight armored brigades, the Germans had no way of knowing Marshal Timoshenko already had begun to re-establish the mechanized divisions. Equipped with the newest Russian tanks, these new units would not be thrown against the Germans until the battle for Smolensk. Even then, only limited numbers would be available.

After the fall of France, the panzer divisions had been reorganized. A whole new series of panzer units were formed by withdrawing cadres from those already existing.

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<sup>28</sup>Keegan, Barbarossa, op. cit., p. 83.

<sup>29</sup>Morris, op. cit., p. 77.



The original tank strength in the panzer divisions--about 400--was too high and besides, many of the machines were the frail Mark I's and II's.

The heavier tanks (Mark III and Mark IV) made a better complement, when balanced against a rather larger proportion of infantry.

By early 1941, a panzer division consisted of one tank regiment of about 150-200 tanks, two motorized rifle regiments (later called Panzer Grenadiers)--whose soldiers were carried in armored half-tracks--and a motorcycle reconnaissance battalion.<sup>30</sup>

Classic blitzkrieg tactics were only partially successful in the void which is Russia. The panzer bites were simply too big. Nonetheless, Hitler insisted upon closing the far-flung pincers, although isolation--the deadliest enemy of high-speed warfare--was the all-too-common result. However, while thousands of Russian troops filtered out of the encirclements, countless others were herded off to German prison camps.

By July 14, if German intelligence was accurate, the Red Army should not even exist. Yet fresh divisions kept appearing.<sup>31</sup> And although Russian resistance continued to stiffen throughout the summer and autumn, the

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<sup>30</sup>Keegan, op. cit., pp. 41-43.

<sup>31</sup>McCullough, op. cit., p. 265.

surge of the panzers could not be restrained.

Without doubt the tank which caused the greatest impact during the war was the Russian T-34, when first it came into action against the Germans in summer, 1941. The Mark III's and Mark IV's, rarely challenged, had remained in production with no radical improvements. Suddenly, they were confronted with a tank capable of knocking them out beyond their range. Mounting a dependable 76 mm. gun, the T-34 was beautifully balanced with an outstanding combination of armament, self-protection, range, speed, and reliability. Broad tracks allowed it to maneuver on soft ground when its German counterparts bogged down. Only the initial incompetence of Russian tank crews robbed T-34 of the full fruits due its technical superiority. Fortunately for the Germans, only about 1,000 of these vehicles had come off assembly lines prior to June 22, and only a handful were assigned to combat units.<sup>32</sup>

The Russian KV (Klimentii Voroshilov)-I was probably the first fully Russian-conceived design to enter production. Much heavier than T-34, KV-I employed many of the same features, although its armor was not sloped nearly so well as that of its lighter combat companion. Both Russian designs are still being used sporadically in front-line service to this day.

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<sup>32</sup>Morris, op. cit., p. 76.

On October 8, 1941, Guderian's panzer group (assigned to Army Group Center) had their first encounter with the T-34. Upon hearing reports from his unit commanders, he wrote:

descriptions . . . of the new tactical handling of the Russian tanks was very worrying. Our defensive weapons available at that period were only successful against the T-34 when the conditions were unusually favorable. The short-barreled 75 mm gun of the Mark IV was only effective if the T-34 was attacked from the rear; even then a hit had to be scored on the grating above the engine to knock it out. It required very great skill to manoeuver into a position from which such a shot was possible. The Russians attacked us frontally with infantry, while they sent their tanks in, in mass formation, against our flanks. They were learning.<sup>33</sup>

Other generals, including Günther Blumentritt and Sepp Dietrich, expressed amazement at their first clash with T-34, armored so expertly that German anti-tank shells glanced harmlessly off its hull.<sup>34</sup>

Also, for the first time, the Germans were without complete air supremacy. This was partially because of the sheer size of Russia, but mainly due to the number of aircraft necessary to protect the German Fatherland from British bombing.

Much has been written about the effect of the Russian winter on the Germans during the fateful drive on Moscow. Many argue "General Winter" played no favorites

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<sup>33</sup>Keegan, Barbarossa, op. cit., pp. 141-43.

<sup>34</sup>Shirer, op. cit., p. 855.



and opposed the Russians as much as he did the Germans. However, this assertion merely reflects a lack of understanding of the overall situation.

Two major factors favored the Russians in that first winter campaign. The weather is always less severe on the defender than on the attacker. And since the major goal of the Germans was to capture Moscow, mobility even in impossible conditions was compulsory. Furthermore, as Moscow was the obvious and only possible objective, no indirect movements or feints could be effective. Direct pressure always steadies the defense and makes supply less complex.

Finally, the Russians were fully prepared for winter. Fur hats, white capes (which also made a less conspicuous target), felt boots, and padded jackets were as essential as skis, sleds, and sleighs. All were issued in the Red Army. The Germans, on the other hand, were completely unprepared for winter.

General Blumentritt wrote:

Then the weather suddenly broke and almost overnight the full fury of the Russian winter was upon us. The thermometer suddenly dropped to thirty degrees of frost. This was accompanied by heavy falls of snow. Within a few days the countryside presented the traditional picture of a Russian winter. With steadily decreasing momentum and increasing difficulty the two panzer groups continued to battle their way towards Moscow.<sup>35</sup>

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<sup>35</sup>McCullough, op. cit., p. 272.

The Moscow offensive was blunted at Tula (just south of the capital) in mid-November. Desperately short of tanks, Tula was defended chiefly by a regiment of 85 mm. anti-aircraft guns, deployed before the city. As the German spearhead approached, the 85's opened fire. Twenty German tanks were knocked out in as many minutes.

Astounded, the Russians laid plans to utilize their newfound weapon. Before the next spring, the 85 mm. gun would emerge as a field/anti-tank gun, as well as in the up-gunned version of the T-34.<sup>36</sup>

Germany's defeat before the gates of Moscow revealed tank strength to be at a low ebb. All units were short of spare parts and many panzer divisions had been reduced to less than one-fourth of original strength.<sup>37</sup> Counter-attacks (beginning December 6, 1941) by the Russians diminished this number even more.

On March 30, 1942, a German Army report revealed the cold facts. Only eight of the 162 total Axis divisions in Russia were fit for an offensive. In the sixteen panzer divisions, only 140 tanks were serviceable, a number less than the normal allotment for one division.<sup>38</sup>

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<sup>36</sup>Weeks, op. cit., p. 102.

<sup>37</sup>Keegan, Barbarossa, op. cit., pp. 139-40.

<sup>38</sup>Shirer, op. cit., p. 909.

Russian losses were even more terrible. By the end of September in 1941, Russia had already lost 2,500,000 men, 22,000 artillery pieces, 14,000 planes, and 18,000 (mostly out-dated) tanks.<sup>39</sup>

Yet the Russians held on. The successful defenses around Leningrad and before Moscow were organized by Marshal Georgi Konstantinovich Zhukov.<sup>40</sup> And the failure of the Germans to capture either of these cities probably saved Stalin's regime. The tide had begun to turn.

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<sup>39</sup>McCullough, op. cit., p. 250.

<sup>40</sup>Georgi K. Zhukov, Marshal Zhukov's Greatest Battles, ed. Harrison E. Salisbury, trans. Theodore Shabad (New York: Harper and Row, Publishers, Inc., 1969), pp. 29-35.



## CHAPTER IV

### THE BEGINNING OF THE END

The Soviet Union's greatest hero of the war, Georgi Zhukov, began his string of victories against the Japanese in 1939. Border clashes in the vicinity of Khalkhir-Gol (on the eastern approaches of Mongolia) had erupted into a small-scale war. Zhukov patiently built up a big advantage in manpower and armor, then drove the Japanese back with crushing losses. However, Zhukov himself was always willing to accept enormous losses. For this, he offered no excuses. After the war, he explained to General Eisenhower:

If we come to a mine field, our infantry attack exactly as if it were not there. The losses we get from personnel mines we consider only equal to those we would have gotten from machine guns and artillery if the Germans had chosen to defend the area with strong bodies of troops instead of mine fields.<sup>1</sup>

Uncharitable reasoning, by Western standards.

Very few support vehicles were assigned to Russian military forces. There were no baggage columns. Any personal effects were carried on the soldier's person.

Most of European Russia is ideal for armored warfare, especially the central and southern sections. Its

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<sup>1</sup>Zhukov, op. cit., pp. 7-8.

flatness is illustrated by the fact that from its source to the mouth, the mighty Volga River falls only two hundred feet. An eyewitness report to the New York Times Magazine observed:

. . . . . that the East has now become a battlefield on which tanks, faster, heavier, and better armed than any the world has ever known before, are fighting a war on a scale greater than ever recorded in human annals.<sup>2</sup>

Russian tank designers understood their job thoroughly. They ignored refinements and concentrated on the essentials--gun power, armor, and cross-country performance. Throughout the war, their suspension systems were far in advance of the west and slightly ahead of Germany. The amazing T-34 was first built in 1939, and was designed by the brilliant Mikhail Koshkin. A simple design, the T-34 does not appear at first to be such an outstanding innovation. However, its performance quickly changes one's opinion. The broad (nineteen-inch) tracks and low ground-bearing pressure of only ten pounds per square inch allowed the tank to maneuver in conditions which immobilized its German counterparts.<sup>3</sup> With 60 mm. of armor, the T-34 weighed about 28 tons. Powered by a 12-cylinder diesel engine, it was faster (32 m.p.h.) than the

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<sup>2</sup>Philip Jordan, "When Tank Meets Tank," The New York Times Magazine, October 19, 1941, p. 9.

<sup>3</sup>Morris, loc. cit.

lighter German tanks. Built in factories throughout the Soviet Union, eventually about 40,000 T-34's were built (according to unreliable Russian claims).<sup>4</sup>

The KV-1, weighing a healthy 46 tons, was powered by the same engine and armed with the same gun as the T-34. Somewhat slower than the T-34, the KV-1 was protected by 106 mm. of armor.<sup>5</sup> Germany's first encounter with this Russian heavy tank was in Lithuania during late summer of 1941. It was a most unpleasant surprise.

A lone KV-1 maneuvered itself into position between a German river bridgehead and an advancing division. It simply parked in the middle of the road, facing the invaders. Soon the Germans brought up a battery of six Pak 38 (anti-tank) guns. From a range of 900 yards, their shells glanced harmlessly off the heavy armor. The KV-1 knocked out two of the guns and damaged the others, causing severe casualties to the crews.

That night twelve German engineers crept up to the tank and placed satchel charges under the suspension. The next morning revealed the tracks had not been cut. In fact, no obvious damage was sustained by the KV-1. Later that day an 88 mm. gun from the bridgehead was cautiously moved to within 800 yards of the tank, seemingly without

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<sup>4</sup>Batchelor and Macksey, op. cit., p. 113.

<sup>5</sup>Ibid., p. 99.



being detected. Just as the gun's crew was readying to fire, the KV-1 swung its turret. The 88 mm. gun was blasted into the ditch.

The situation was serious. One tank was holding up the advance of an entire division!

The next morning six German tanks maneuvered into concealed positions surrounding the KV-1. Their shells had no effect on the Russian tank, but did succeed in occupying the crew's attention. At this time the Russians failed to notice that another 88 mm. gun was being moved in behind them. The seventh shell finally knocked out the tank. Later examination revealed only two of the 88 mm. shells had penetrated the KV-1's armor.

Very much sobered, the German advance again continued, having been delayed forty-eight hours by a single tank.<sup>6</sup>

Even before these excellent Russian tanks were encountered, Hitler had demanded a higher velocity gun for the Mark IV. Nevertheless, the Ordnance Office argued against it.<sup>7</sup> When the need was shockingly exposed, German tank soldiers asked at first the T-34 be copied. This request was rejected for obvious reasons. German industry

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<sup>6</sup>Weeks, op. cit., pp. 58-59.

<sup>7</sup>Albert Speer, Inside the Third Reich, trans. Richard and Clara Winston (New York: Macmillan Co., 1970), p. 233.

did not possess the facilities to produce the type of armor or the light alloy diesel engine that made the T-34 so effective. Besides, Germany needed to think about the next generation of Russian tanks, not the present one. In the meantime, Mark III and Mark IV were up-gunned and up-armored. This went far to restore the balance, although a lack of spare parts remained a serious problem. By 1942, most panzer divisions were being re-equipped with the up-gunned version of the Mark IV. Its armor was not sloped so well as that of the T-34, but its high-velocity 77 mm. gun made up much of the difference.<sup>8</sup>

While the army requested a tank with greater maneuverability than the T-34, Hitler insisted increased gun range and thicker armor was the greater need and would produce more favorable results. Quoting figures of shell velocity and penetration results by heart, he would often include the completely irrelevant example of warships. He explained:

In a naval battle the side having the greater range can open fire at the greater distance. Even if it is only half a mile. If along with this he has stronger armor . . . . he must necessarily be superior. What are you after? The faster ship has only one advantage: to utilize its greater speed for retreating. Do you mean to say a ship can possibly overcome heavier armor and superior artillery by greater speed? It's exactly the same for tanks. Your faster tank has to avoid meeting the heavier tank.<sup>9</sup>

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<sup>8</sup>Macksey, Panzer, op. cit., p. 78.

<sup>9</sup>Speer, loc. cit.

This argument fails to be convincing when one considers the nature of land, the effect of weather, and the infantry element. However, when the superior Russian industrial capacity is taken into account, it begins to sound like a good idea.

The Germans decided it was essential they develop a new medium and heavy tank. The proposed tanks, to be called Panther (Mark V) and Tiger (Mark VI), were originally to weigh thirty and fifty tons, respectively. They were both to employ the same powerful engine, allowing the lighter Panther (as its name implies) much more agility. However, Hitler's demands for increased armor eventually raised Tiger's weight to fifty-six tons and Panther's to about forty-eight tons.<sup>10</sup> As a result, Tiger's frontal armor was 100 mm. while Panther's was 120 mm. The main armament of the Panther tank was to be the very effective high-velocity 75 mm. gun.<sup>11</sup> The armament of the Tiger will be discussed later.

Still harboring dreams of a super-heavy tank in excess of one hundred tons, Hitler prevailed upon Dr. Porsche to undertake the design of such a machine. Of necessity, they would have to be built in small numbers,

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<sup>10</sup>Ibid., p. 234.

<sup>11</sup>Batchelor and Macksey, op. cit., pp. 128-29.



one at a time. The project was code-named "Mouse," but never advanced beyond the planning stages.<sup>12</sup>

Let us not forget the original intention of the tank concept was to protect soldiers from enemy fire. And although the tank role was later expanded, it would be for naught unless the crew's safety was guaranteed. Since the shield is only as strong as its weakest seam, types of armor and particularly the techniques of joining armor plates should be of special interest.

First of all, it was essential plate quality be high, for impurities in the armor could cause it to fail when struck. However, high-quality armor is often difficult to work, resulting in production problems and unmerited costs.

Because electrical welding was only in the developmental stages, the thin armor plates used by the earlier tank models had to be joined in another way. Before hardening, the plate had to be drilled--an intricate process that often caused cracking. The plates would then be riveted together and attached to a frame. When gaps inevitably occurred, the hazard to the crew increased. Shells striking the hull produce molten metal (called "splash") which could pass through the gap and ricochet about the interior of the tank.

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<sup>12</sup>Speer, loc. cit.

The industrial boiler plate used on some primitive models was easily obtainable and simple to attach (to existing vehicles) by means of bolts. Unfortunately, boiler plate was formed of low-grade steel and allowed penetration by rifle bullets. As if that was not bad enough, the bolts tended to snap off under a few sharp blows.

Casting was far and away the best method of armoring. However, it was a formidable undertaking, particularly if large designs were involved.

Before the Second World War, civilian industry had little use for heavy electric welding. And although research had demonstrated techniques by which it could be accomplished, this method of jointing was slow to come into use. Due to expense as much as to conservatism, British firms were reluctant to adopt this superior method. As a result, British armor was criticized (justifiably) throughout the war as being of inferior quality.

Allied armor plate was nearly always of high quality. Any problems generally resulted from the selection of the wrong type of plate or, early in the war, of shortages. Once the Americans built bigger foundries, however, large castings could be mass produced. By so doing, the need to join plates was reduced and strength was greatly increased. On the other hand, British industry--already established--continued to rivet and bolt plates,

only slowly converting to electric welding.

In Germany, all tanks produced after 1934 were welded. Although several technical difficulties surfaced in connection with uneven cooling, cracking, and various other problems, welding embodied great strength. At the same time, production was simplified with the immediate advantage of increased numbers and reduced costs.<sup>13</sup>

Needless to say, the angle at which armor was struck largely determined whether the shell penetrated the hull or was deflected. Although sloped armor was vastly superior to armor plates hung vertically, early tanks--to accommodate riveting--were forced to employ the latter method. Casting and welding processes later made sloped armor easier to attach. To illustrate the value of sloping, as opposed to hanging armor vertically, armor sloped at only 50 degrees doubled protection without increasing its thickness or weight.<sup>14</sup> An armor plate one inch thick (average for a light tank) can weigh 41 pounds per square foot. On a light tank, a one-inch coverage of armor weighs ten tons.<sup>15</sup>

Before the war, most steel plate was of the "face-hardened" type. This sort was specially processed to give

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<sup>13</sup>Batchelor and Macksey, op. cit., p. 100.

<sup>14</sup>Ibid., p. 119.

<sup>15</sup>Morris, op. cit., p. 139.



a hard, penetration-resistant surface layer. A softer but stronger core supported the hardened surface. It was effective against early armor-piercing shells, for the hard surface caused the nose of the projectile to shatter. It was later discovered face-hardened steel could be defeated by making the nose of shells blunter and by fitting them with a soft steel cap. Since this type of armor already was expensive and time-consuming to manufacture, its conquest meant its general abandonment.<sup>16</sup>

Some designers built double-hulled tanks. With an air space between the surfaces, the shell often would detonate prior to reaching the inner hull, thus sparing the tank and the crew.<sup>17</sup>

However, as the war wound down, most successful tanks depended on more simple protection--the intelligent sloping of thicker armor.

Accordingly, in terms of firepower and armor protection, Tiger put the Germans ahead of the Russians. Its main armament was the gun which had proven most successful in coping with the T-34--the 88 mm. dual-purpose gun. Originally designed as an anti-aircraft gun, the 88 mm. gun was discovered to be remarkably versatile. Too often,

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<sup>16</sup>Ibid.

<sup>17</sup>Batchelor and Macksey, loc. cit.

however, due to its hurried production, the Tiger broke down. A lack of speed and difficulty in handling eventually restricted Tiger to a mainly defensive role. However, in spite of teething problems, Tiger boasted of two innovative features: a schnorkel tube, which allowed wading up to thirteen feet; and torsion bar suspension, designed by Dr. Porsche. Although this suspension system was incredibly strong and compact, it was also very simple. The bar was attached to the tank's hull and flexed (on a spring) with the up and down movements of the wheel.<sup>18</sup>

While the Germans were feverishly producing a new generation of tanks, Russian armed forces swelled to 5,534,500 men, 4,959 (late-model) tanks, over 40,000 guns and mortars, and 2,480 aircraft.<sup>19</sup>

To make matters worse, in January of 1942, Hitler--influenced by his artillery officers--ordered much of the tank chassis industry into assault gun production. Although the absence of a complicated turret mechanism made these vehicles much simpler to produce in quantity, they were at a definite disadvantage on the battlefield.<sup>20</sup>

On the morning of February 8, 1942, a turning point was reached in German arms production. The Minister

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<sup>18</sup>Ibid., pp. 82-83.

<sup>19</sup>Zhukov, op. cit., p. 114.

<sup>20</sup>Geoffrey Jukes, Kursk: The Clash of Armour (New York: Ballantine Books, Inc., 1968), p. 28.

of Armaments and Munitions, Dr. Fritz Todt, was killed in an airplane crash.

Just before 1:00 p.m. that afternoon, Hitler's architect, thirty-six year old Albert Speer, was summoned to his Führer's office at Rastenburg, in East Prussia. Although Speer had no experience in either industry or politics, he was entrusted with all of Todt's responsibilities.<sup>21</sup>

Albert Speer combined good sense and sound decentralization (with astonishing success) within a national system being over-centralized by Hitler. Except for the SS production, over which he had no control, Speer brought order and cooperation.

By August of the same year, according to Index Figures for German Armaments End-Products, production had increased 27 percent for big guns, 25 percent for tanks, and 97 percent for ammunition. Total armament production increased by 59.6 percent.<sup>22</sup>

Speer, along with the military high command, argued in favor of producing more spare parts. They reasoned repairing existing tanks was less expensive and more practical than building new ones. Even though spare parts were almost impossible to get on the Eastern Front,

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<sup>21</sup>Speer, op. cit., pp. 194-95.

<sup>22</sup>Ibid., p. 210



panzer units hesitated to send damaged tanks to Germany for repair. They feared that they might not be returned. Panzer leaders felt a patched tank in the hand was worth more than two working tanks in Germany. In addition, Hitler preferred to assign new tanks in to units being formed at home, in preference to those on the front. Finally, he argued if adequate spare parts were produced, new tank production would be reduced by 20 percent (from Führerprotokoll, May 6-7, 1942, Point 38).<sup>23</sup>

Meanwhile, Russian T-34's and KV-1's were rolling off their assembly lines in the Urals at a rate of about two thousand per month. By contrast, monthly production of Mark IV, Germany's most useful tank, only topped the 100 mark in October of 1942.<sup>24</sup> Even worse, the Mark IV was inferior to T-34 in every respect, except in the gun-power of its latest version.

Spring and summer of 1942 witnessed a replay of the previous summer's German victories. However, because of irreplaceable losses in manpower the previous year, the offensive was restricted to the southern portion of Russia. Apparently giving up on Moscow, Hitler hoped to strangle the Soviet war effort by seizing the Caucasus oil fields.

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<sup>23</sup>Ibid., p. 234.

<sup>24</sup>Jukes, op. cit., p. 25.

Rolling across the seemingly endless steppes, the panzers drew closer to Stalingrad and a date with destiny.

It is highly possible had the Russian city of Tsaritsyn not been renamed Stalingrad, it would not have become the most crucial battleground of the war. Located on the Volga, Stalingrad was a natural point to anchor the northern flank of the German offensive. However, it is doubtful its position justified the involvement and sacrifice of the entire German Sixth Army. Most likely, Hitler envisioned the fall of Stalingrad would humiliate his most despised opponent. The propaganda aspect overshadowed its military value, and the Führer became obsessed.

Most experts are convinced Stalingrad could have been taken on the run, but interference and indecision by Hitler prevented its capture.<sup>25</sup> The one possible fallacy in this allegation is to assume that different German

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<sup>25</sup>William Craig, Enemy At the Gates: The Battle for Stalingrad (New York: Reader's Digest Press/E. P. Dutton and Co., Inc., 1973), pp. 19-21. After the war, General Ewald von Kleist (commanding the First Panzer Army) confided this belief to Liddell Hart: "The Fourth Panzer Army . . . could have taken Stalingrad without a fight at the end of July, but was diverted south to help me in crossing the Don. I did not need its aid, and it merely congested the roads I was using. When it turned north again a fortnight later the Russians had gathered just sufficient forces at Stalingrad to check it." Liddell Hart, The German Generals Talk, pp. 169-71.

decisions would have produced the same Russian reactions. Still, the battle has been refought many times in the memoirs of German generals, always with a different outcome.

As in Warsaw, the concept of blitzkrieg was totally useless in Stalingrad. There the panzers forfeited their advantages and allowed the Russian infantry to dictate the mode of combat. Marshal Zhukov, in command of the overall defense of the southern front, contained the Germans in the city. Then, in November, he unleashed his newly-formed tank armies, smashing through apathetic satellite armies (guarding the German flanks) and surrounding the German Sixth Army. After a feeble and belated attempt at relief, the pathetic remnants of the Sixth Army finally capitulated on February 2, 1943.<sup>26</sup>

Besides irreplaceable losses of manpower, the Germans lost 1,500 tanks and 60,000 support vehicles. These figures represent the equivalent of six months' production.<sup>27</sup>

The previous September (1942), Tiger had made its first battle appearance. Committed in unsuitable terrain in a secondary action, however, it was not effective.

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<sup>26</sup>Ibid., p. 390.

<sup>27</sup>Morris, op. cit., p. 92.



Having learned the lessons of the past, Russian generals now handled their tank forces with confidence and skill. Substantial Lend-Lease aid from the United States in the form of trucks and canned foods revolutionized Russian supply problems. Their biggest weakness was their tendency to maintain advances which were costly and unprofitable. This weakness allowed the Germans to stabilize the front and gain a needed respite.

In March, 1943, General Erich von Manstein, commanding Army Group South, recaptured Kharkov in a brilliant armored operation. For the first time Tigers were able to demonstrate their ability.<sup>28</sup>

Only in November (1942) had Tiger production reached 25 vehicles per month (up from thirteen the previous month). Around December 1, it was decided to stop producing Mark III. This move did not increase production of more modern types, however, for Hitler ordered the continued production of the Mark III chassis for use in self-propelled assault guns.

In desperation, the OKH (Army High Command) requested (in February, 1943) the abandonment of all tank production except that of Tiger and Panther.<sup>29</sup> However, since those models only trickled off the assembly lines,

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<sup>28</sup>Ibid.

<sup>29</sup>Jukes, op. cit., p. 29.

compliance with the request would have had disastrous results. The Mark IV, meanwhile, was still effective in skilled hands, now that it at last had a gun comparable to the 76.2 mm. gun mounted by T-34.

Those Panthers of the first 325 sent to Russia which could be recovered were recalled to Germany for rebuilding, due to various defects (in steering, power plant, etc.).<sup>30</sup>

Panther was a great tank, despite early difficulties. The real tragedy, from the German viewpoint, was it could never be built in sufficient quantities to meet a desperate situation. And although Albert Speer was able to increase output to almost miraculous numbers, only 5,508 Panthers were built during the course of the war. One of the major obstructions to production was the strategic bombing by the Allied air forces. Other problems resulted from a dilution of skilled labor and a failing supply of vital materials.<sup>31</sup>

On February 20, 1943, Colonel General Heinz Guderian was appointed Inspector-General of Armored Forces. He had been forcibly retired by Hitler during the winter of 1941-42, but his expertise was again needed. And although self-propelled guns remained a part of the

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<sup>30</sup>Macksey, Panzer, op. cit., p. 110.

<sup>31</sup>Batchelor and Macksey, op. cit., pp. 128-29.

artillery arm and were not under Guderian's control, at least the panzer soldiers now had a spokesman in Berlin.

Production of the new Tigers, Panthers, and Ferdinands (heavy assault guns) would go on, but "mad scientists" like Dr. Porsche would find it more difficult to sell wild ideas for super-heavy tanks.<sup>32</sup>

Guderian was appalled at the condition to which his beloved armored divisions had sunk. His original establishment for a panzer division in 1940 called for four battalions of one hundred tanks each. Guderian thought the dilution to 200 tanks and one battalion of assault guns (during winter of 1941-42) was bad enough, but German tank production was not able to replace losses on the Eastern Front. When he assumed his new office, the eighteen panzer divisions in Russia had only 495 battle-worthy tanks among them--an average of only 27 per division. Guderian therefore felt that Germany should not plan a major offensive for the coming summer, as the time was needed to restore the armored units to an effective strength.<sup>33</sup>

His arguments were to no avail, however, for Hitler's Balkan politics required that Germany resume the

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<sup>32</sup>Jukes, op. cit., pp. 29-31.

<sup>33</sup>Ibid., p. 36.



offensive. As early as April, Russian intelligence uncovered the German plans and prepared for the assault.<sup>34</sup> Russian industry was now fully mobilized for war, and for the first time since the war in Russia began, the Russians were confident in their ability to prevail. And due to the lavishness with which the United States provided trucks and jeeps to the Soviet Union, Russian industry was able to focus on the manufacture of weapons.

Operation "Zitadelle" (Citadel), code-name for the German summer offensive, was devised to pinch out the Kursk salient--a huge bulge which dominated the Eastern Front. After the Russian forces in the salient were disposed of--the Germans hoped--there would be a repetition of the routs that characterized "Barbarossa" two years earlier. After delays to build up tank strength, the offensive finally began on July 5, 1943.<sup>35</sup>

The Battle of Kursk, as the Russians called it, produced the greatest armored clashes in history. Although

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<sup>34</sup>Ibid., pp. 45-46. Soviet intelligence penetrated the OKW (High Command of the Armed Forces), itself. Rudolph Rossler, code-named "Lucy," was an anti-Nazi German living in Switzerland. Acquainted with ten high-ranking officers who shared his anti-Nazi views--eight employed in OKW--Rossler was able to provide valuable information to the Russians. In fact, orders often were read in Moscow before they reached the German field commanders.

<sup>35</sup>Ibid., p. 85.

the Germans were armed with new and more powerful tanks (Tiger and Panther), the Russian defenses were simply too deep. In addition, the Red Army held clear advantages in manpower, artillery, and tanks. And for the first time, the Russian air force held a numerical advantage over the Luftwaffe.<sup>36</sup>

Probably the biggest single mistake made by the Germans was to give up the opportunism of mobile war and meet the Russians on ground of their own choosing.

By the end of the first day, 163 Panthers had broken down--due to mechanical ailments. Only forty could be recovered.

On July 13, six hundred German and nine hundred Soviet tanks clashed in one last, desperate German attempt to break through. This was the largest single tank engagement of the war. On that day the Wehrmacht lost four hundred tanks and ten thousand men.<sup>37</sup>

A few days later, Zhukov launched a massive counter-offensive--chasing the Germans back beyond Kharkov and toward the pre-war borders.

Both Tiger and Panther performed well, despite some technical difficulties. On the other hand, Ferdinand

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<sup>36</sup>Ibid., pp. 78-79.

<sup>37</sup>Morris, op. cit., p. 96.

proved vulnerable to infantry, due to its lack of secondary armament (machine guns).

Later up-armoring of T-34 and the introduction of the "Josef Stalin" (heavy tank) series put the Russians back on an equal basis with the Germans in armored quality. Even without these improvements, however, the Battle of Kursk revealed that the strategic balance had shifted in favor of the Red Army.



## CHAPTER V

### A FINAL BLAZE OF GLORY

While the summer of 1943 saw the Russians gain the upper hand on the Eastern Front, it is necessary to retrace back two years in order to review the events taking place in North Africa.

In the desert war, the British Crusader made its first appearance against the Germans in June, 1941 during Operation "Battleaxe." At 18.5 tons, Crusader was fast and graceful-looking. Speeding across the desert with its treads churning up sand, it made an impressive sight. On the negative side, however, Crusader's light 40 mm. gun and its relatively thin armor left it generally inferior to Rommel's Mark IV's. Moreover, the pace by which Crusader was forced through production resulted in the inability to iron out defects before actual combat. During "Battleaxe," more Crusaders fell into enemy hands due to mechanical breakdown than to battle damage.<sup>1</sup>

The first American tank to see action in North Africa was the light (12 tons) M3 Stuart. Sometimes called "honey," the Stuart was developed over a decade and was therefore very reliable. Yet its 37 mm. gun and 43 mm.

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<sup>1</sup>Batchelor and Macksey, op. cit., p. 109.

armor left it a step behind the latest German weapons.<sup>2</sup>

Always lagging in design and production of tanks, the United States built only 300 tanks in 1940. And of the 4,100 tanks produced the next year, almost all were the outdated M3.<sup>3</sup> However, at the same time, preparations were being made for full-scale production. The giant American motor corporations--General Motors, Ford, and Chrysler (to name the largest)--were busily laying down their assembly lines.

Already under development in 1940 was the medium tank M3A1, designated General Lee. For want of something better this badly arranged machine went into production. Mounting a limited traverse 75 mm. gun in the hull and a 37 mm. gun in its tiny turret, the Lee was forced to expose its bulk in order to engage the enemy. This was not done because the Americans enjoyed danger, but because in 1941 their industry was incapable of producing anything better. It staggers the mind when one considers the technology necessary to produce the castings and other components that enable the construction of a tank that could house the 75 mm. gun in its turret. Furthermore, the Lee faced another disadvantage. While its gun threw a

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<sup>2</sup>Macksey, Tank, op. cit., p. 78.

<sup>3</sup>Ibid., p. 93.

14.4-pound shot at 1,850 feet per second, the Mark III's 50 mm. gun achieved 2,700 feet per second with a 4.5-pound shot.<sup>4</sup>

The next American medium tank, the M345 (General Grant), was similar to the Lee. Possessing most of the Lee's shortcomings, Grant came into production in July of 1941. By April of the next year, two thousand models had been built.<sup>5</sup>

The most famous American tank of the war, the M4 (General Sherman) first appeared in prototype three months before America's entry into the war. Sherman was a major breakthrough in American tank design, for finally they had produced a machine with thick armor (81 mm.) and a good 75 mm. gun--mounted in a full-size, rotating turret. Sherman weighed 33 tons and carried a full crew of five. One innovation was a gun stabilizer that tried, without success, to allow the gunner to maintain constant gun elevation while moving.<sup>6</sup> The device could not keep pace with the pitching of the tank, however, and resulted in a sort of shell spray. The effect was not totally without value, although it caused little material damage. The Sherman incorporated a spiral-spring, bogie-type suspension that

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<sup>4</sup>Batchelor and Macksey, op. cit., p. 112.

<sup>5</sup>Macksey, Tank, op. cit., p. 96.

<sup>6</sup>Ibid.



helped achieve mobility and effectiveness when moving over rough terrain. Also introduced on the Sherman were rubber-block, rubber-jointed tracks. While the metal-jointed tracks of the German Mark IV could only be expected to last an average of 600 miles, it was not unusual for the Sherman to get 3,000 miles from its tough rubber tracks.<sup>7</sup> Its biggest disadvantage was the relatively high silhouette, made necessary by its use of a bulky, radial engine.

The successor to the Sherman was to be the M26 (General Pershing)--mounting a powerful 90 mm. gun. However, production plans were postponed early in 1943 in order to concentrate on Sherman. As a result, the M26 would not be ready for delivery until late in 1944.<sup>8</sup> Meanwhile, American assembly lines were turning out Shermans in remarkable numbers. At the peak of production, a Sherman could be assembled (from prefabricated parts) in thirty minutes. Before the end of the war, 49,234 Sherman tanks were built in the United States.<sup>9</sup>

As late as 1967, modified Shermans were employed by Israel against some old T-34's possessed by the Egyptian Army.

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<sup>7</sup>Morris, op. cit., p. 85.

<sup>8</sup>Macksey, Tank, op. cit., p. 129.

<sup>9</sup>Morris, op. cit., p. 86.

The combat debut for Sherman was not even with American tank crews. The first several hundred tanks produced were sent to Field Marshal Bernard Montgomery's British Eighth Army. On October 23, 1942, during the decisive Battle of El Alamein, they were ordered into action. Capable of firing high explosive (as well as armor-piercing) shells, the presence of the Sherman allowed the British to engage exposed 88 mm. guns on relatively equal terms for the first time.<sup>10</sup>

Britain's own Churchill infantry tank suffered numerous mechanical problems before proving its toughness and agility on the steep slopes of Tunisia. The Churchill weighed 39 tons and mounted two guns--a 76 mm. in the hull and a 40 mm. in the turret. Produced after Dunkirk (1940) mainly for want of something better, it did incorporate several excellent points. Its steering system conserved much of the power generally lost in turning. In fact, the tank could be pivoted on its axis while in neutral. The spacious interior permitted storage of 150 rounds of 40 mm. shells and 58 rounds of 76 mm. shells in addition to the five-man crew. In the Mark III version of Churchill, the 40 mm. gun was replaced with a 57 mm. gun. The tank first saw action with Canadian crews in the (1942) Dieppe commando raid.<sup>11</sup>

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<sup>10</sup>Macksey, Panzer, op. cit., p. 88.

<sup>11</sup>Batchelor and Macksey, op. cit., p. 102.

In 1943, the closest the Western Allies could come to matching the German Panther was with the Sherman. The British adopted the American tank because their own industry failed to produce anything as effective. Nonetheless, shot fired from Sherman's 75 mm. gun attained only 2,030 feet per second as compared to 3,068 feet per second achieved by Panther's long-barreled 75 mm. gun.<sup>12</sup>

The British adaptation of Sherman--called Firefly--was armed with their own excellent 76.2 mm. gun. In the summer of 1944, it was the only Allied tank capable of dealing effectively with either Tiger or Panther. Unfortunately, only about 25 percent of the British armored units were equipped with Fireflies.<sup>13</sup>

Prior to the Allies' invasion of Hitler's "Fortress Europe," the better panzer divisions were concentrated near Calais. Elsewhere along the coast--including Normandy--the German tanks were assigned to units near the beaches. This deployment was a result of Rommel's ill-conceived belief that the Anglo-American-Canadian landings would be attempted exclusively by infantry. Located conveniently nearby, the panzers could blast the beachhead back into the sea, thereby saving thousands of soldiers for the Eastern Front. If, however, the Allies

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<sup>12</sup>Ibid., p. 129.

<sup>13</sup>Ibid., p. 132.



managed to accomplish the "impossible" and land tanks with the amphibious troops, the panzers would be more lethal in a mass stroke after the landing was established. Unfortunately for the Germans, there were no strategically-located panzer divisions to carry out such a stroke when the need later became evident.<sup>14</sup>

If the Germans were not equal to the occasion, the Allies were. Specially adapted armored vehicles, popularly called "funnies," would spearhead the planned assault. On June 6, 1944, it came.

On all but one of the five invasion beaches, "funnies" of the British 79th Armored Division not only saved many lives but contributed enormously to the morale of the troops. Only on "Omaha" beach--where the American commander refused to use the "funnies"--were the casualties extreme.<sup>15</sup>

Included among the "funnies" were the following special vehicles.

The Sherman Duplex-Drive (D.D.) amphibious tank was fitted with a collapsible canvas flotation device and twin propellers. The moment its tracks touched the beach, the front half of the flotation screen would be dropped and the tank was ready for action. These vehicles provided

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<sup>14</sup>Morris, op. cit., p. 99.

<sup>15</sup>Kershaw, op. cit., p. 56.

cover for the Sherman Crab, a tank specially equipped to flail the beach with numerous chains--clearing the area by exploding anti-personnel mines. The British Churchill Ark (non-combat vehicle) was actually a mobile bridge for crossing anti-tank ditches.<sup>16</sup>

The success on D-Day established the long-awaited "second front." With hundreds of Allied tanks flooding ashore and with the Anglo-American air forces in firm control of the skies, victory was in sight at last.

German industry in 1943 produced 5,996 tanks (including 3,073 Mark IV's), 3,411 assault guns, and 2,657 self-propelled gun carriages. Since it was becoming more and more difficult to increase production, newer and more powerful tank designs promised to be Germany's best investment. In October of that year Hitler and Guderian inspected prototypes of the next generation of the Mark VI Tiger--Tiger II--along with the tank-hunting version of Panther--the Jagdpanther.<sup>17</sup> Both were manned by a crew of five and were armed with the proven 88 mm. gun. From a range of 1,000 yards, this mighty weapon could penetrate 170 mm. of armor plate sloped at 30°. <sup>18</sup> The Jagdpanther was protected by 80 mm. of well-sloped armor while the

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<sup>16</sup>Ibid.

<sup>17</sup>Macksey, Panzer, op. cit., p. 120.

<sup>18</sup>Ibid., p. 133.

Tiger II boasted of an unprecedented 185 mm. of steel plate. In terms of weight (68 tons), the Tiger II got out of hand. However, the armor slope, the arrangement of crew positions, the excellence of the optics to match its main armament, and the accessibility of parts made it all worthwhile. Pressed into service late in 1944, only 484 Tiger II's were built. Deservingly known as "Royal" or "King" Tiger, it was the most powerful fighting vehicle produced in the Second World War.<sup>19</sup>

On one occasion during the Battle of the Bulge, a lone King Tiger halted an entire task force of the Second (American) Armored Division. Defiantly planted at a crossroads north of Bastogne, the German tank withstood everything the Americans could hurl at it, including artillery, for two hours. Finally, it lumbered off, undamaged.

American tank crews were frustrated against the better German tanks. Sherman's only advantage was mobility, for its 75 mm. gun could not penetrate Tiger II's 8-inch frontal armor, even at point-blank range. On the other hand, the Tiger's 88 mm. gun could destroy a Sherman at ranges up to a mile and one-half.<sup>20</sup>

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<sup>19</sup>Batchelor and Macksey, op. cit., p. 132.

<sup>20</sup>Roland C. Gask, "Must We Defeat Germany With Inferior Weapons?," Newsweek, February 26, 1945, p. 38.



German tank production continued to improve throughout 1944, despite heavy Allied bombing. More than 19,000 armored fighting vehicles of all types (including 3,955 Panthers) were manufactured that year, with most major weaknesses resolved.<sup>21</sup> However, of the 1,764 tanks manufactured in September and October, only 1,371 reached the front lines, due to transport disruption.<sup>22</sup>

To illustrate further the futility of the German effort, during the same year (1944) the British produced 30,000 armored vehicles, the Russians 30,000, and the Americans an astronomical 90,000.<sup>23</sup>

Russia, whose survival depended on the strength of her army in a war fought by armor, had no alternative other than to assign her best resources to tank production and her best personnel to tank units. The successor to the KV-1 and the second-generation KV-85 was the JS (Josef Stalin)-2, introduced in 1944. A very powerful vehicle, the JS-2 weighed 46 tons and had 160 mm. of frontal armor. Its armament consisted of one 122 mm. gun and four machine guns.<sup>24</sup>

JS-3 also came into production in 1944, although

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<sup>21</sup>Macksey, Panzer, op. cit., p. 127.

<sup>22</sup>Ibid., p. 141.

<sup>23</sup>Morris, op. cit., p. 92.

<sup>24</sup>Batchelor and Macksey, op. cit., p. 130.

only limited numbers were in service before the war ended. Its sloped armor and domed turret suggested engineering perfection, but it later became evident that its low-silhouette engineering reduced the amount of ammunition carried, severely restricted crew space, and lowered the rate of fire and crew endurance to a relatively poor level.<sup>25</sup>

Besides the war, itself, probably the greatest insult to man resulted from the Western Allies' policy of sacrificing quality in order to increase the number of tanks produced. Kenneth Macksey, a former British tank officer, wrote:

Sheer numbers, in the end, were probably the decisive factor, but the needless losses incurred in sacrificing quality to numbers are no credit to those whose vacillation policies had permitted such a situation to arise. To tax the goodwill and lives of the crews for doctrinaire reasons by allowing genuine research into the future to be clouded and prevented by subjective reasoning, could be tantamount to an underevaluation of human dignity. It was the good fortune of the Allied leadership and industry that there were soldiers in the field whose determination in action could make up for technical deficiencies in defeating an enemy who was every bit as skilful and brave as--and usually better equipped than--themselves.<sup>26</sup>

On the Western Front, the American M26 and the new British Comet gave the Allies parity with German armor. The Comet weighed 33 tons and mounted a 77 mm. gun, yet it was not Britain's best tank of the war. Another tank

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<sup>25</sup>Ibid., p. 133.

<sup>26</sup>Macksey, Tank, op. cit., p. 159.

was rushed across Europe in an effort to acquire a baptism of fire before the war ended. Designated Centurian, it weighed 47 tons and possessed 120 mm. of well-sloped frontal armor. The effective 76.2 mm. gun provided the firepower.<sup>27</sup> After more than five years of war, Britain at last had produced a tank worthy of her crews. The irony was that the need had passed, for on the morning of May 7, 1945, Germany surrendered.<sup>28</sup>

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<sup>27</sup>Ibid., p. 155.

<sup>28</sup>New York Times, May 7, 1945, p. 1, col. 1.



## AFTERWARD

With the end of the war in Europe, many experts began to cast doubts upon the future of tanks in warfare. They asserted the new hollow-charge missiles--such as bazookas--and the advent of nuclear weapons would make tanks obsolete. Yet every challenge creates an answer. And those who foretold the end of tanks failed to provide a substitute for them. If war was to continue, as every sign in 1945 indicated that it would, armies would be required, and armies require armored vehicles. In fact, to assume nuclear capability deters conventional aggression is to deny the events of the past thirty years.

As a decisive weapon of our age, the tank reached its zenith during World War Two. It is doubtful the world will ever again witness huge formations of tanks battling in Europe or anywhere else.

Nonetheless, recent fighting in the Middle East and the (1969) Soviet suppression in Czechoslovakia proved that tanks not only remain militarily important but are politically significant as well. Continuing dissidence around the globe insures the role of tanks will remain constant during the foreseeable future.

Any evaluation of armor's role in the Second World War must begin and end with the German panzer divisions,

for it was their example that the Allies followed. The secret of the early German successes was not due to masses of tanks (as was believed in 1940) but was owing to the "coordinated use of all the weapons in the panzer division, in the complete control exercised by commanders during operations, and in cooperation with planes."<sup>1</sup>

From the beginning, panzer soldiers were an elite. It is likely the knowledge of their danger and a recognition of their constant presence fortified the courage of the tank crew. And although a number of weapons could penetrate a tank's armored skin, it is important to bear in mind that armored protection is defensive and has never been considered a tank's principal asset.

By combining immense firepower and hitherto unheard of mobility with supporting airpower, the panzer divisions produced the most daring, innovative tactics of this century.

Knocking out the most highly-rated armies in Europe, they were robbed of total continental domination only by the geographic accident of the sea shielding Britain, and the endless steppes of Russia. It also should be remembered that, to within the last months of the war, German panzer divisions were still capable of staggering the Allied armies.

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<sup>1</sup>"Panzer Juggernauts," Newsweek, August 4, 1941, p. 15.

History has rarely produced a new mode of warfare which appeared so suddenly and prevailed as thoroughly as did the panzer divisions of Nazi Germany.



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"Supreme excellence consists in breaking the enemy's resistance without fighting."

"Military tactics are like unto water; for water in its natural course runs away from high places and hastens to strike what is weak."

"He will conquer who has learnt the artifice of deviation. Such is the art of manoeuvring."

"Rapidity is the essence of war; take advantage of the enemy's unreadiness, make your way by unexpected routes, and attack unguarded spots."

"Generally in war the best policy is to take a state intact; to ruin it is inferior to this."

"The worst policy is to attack cities. Attack cities only when there is no alternative."

---Sun Tzu, The Art of War (500 B.C.)

"The whole art of war consists in a well-reasoned and extremely circumspect defensive, followed by rapid and audacious attack."

"The moral is to the physical as three to one."

---Napoleon

"Mystify, mislead, and surprise."

---Thomas "Stonewall" Jackson

"Git thar fust with thuh most men."

---Nathan Bedford Forrest

"People have killed only when they could not achieve their aim in other ways. There is a broadened strategy, with intellectual weapons. Why should I demoralize the enemy by military means if I can do so better and more cheaply in other ways."

"Our strategy is to destroy the enemy from within, to conquer him through himself."

---Adolf Hitler